New Concrete Paving Record
How It Was Done page 60

October, 1960

ROADS AND STREETS

A GILLETTE PUBLICATION

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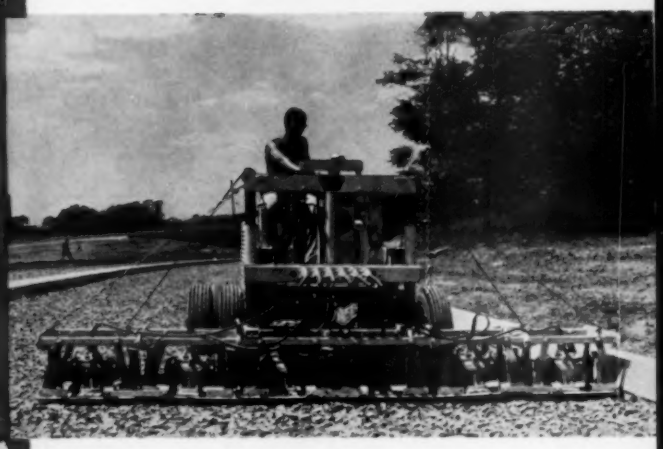
Important NEW features of the

JACKSON

AMERICA'S MOST POPULAR
MULTIPLE-SHOE
VIBRATORY COMPACTOR



Changing from the 13 ft., 3 inch working width to 88 inches overall for road travel or maneuverability on the job is accomplished hydraulically in just 30 SECONDS.

The new widening attachment (optional at added cost) is raised or lowered instantly. Makes the JACKSON by far the most efficient compactor for widening projects.

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1. The 2 outer compactor units at each side of the workhead can be hydraulically raised to a vertical position for road travel or maneuverability around other equipment in just 30 SECONDS. Compare this with the time consuming job required on other equipment.

2. The new widening attachment can be instantly lifted or lowered when entering or leaving the area to be compacted.

With these added features there is nothing in its category that matches the JACKSON. 4200 3-TON BLOWS PER MINUTE from each of the compactor units provide extremely high productivity. 100% of specified density is frequently attained in one pass. And the Jackson does not leave the top 1-inch of the lift in a loose condition . . . a very important consideration. It operates in either direction . . . no turning or deadheading required. It reduces downtime to a minimum. Maintenance and economy of operation are exceptionally low.

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FRONT COVER SCENE

Compaction on high-speed scraper job, arterial relocation near Walnut Creek, California. Contractor: Chas. L. Harney, Inc., of San Francisco. Equipment in foreground: Buffalo-Springfield Kompactor.

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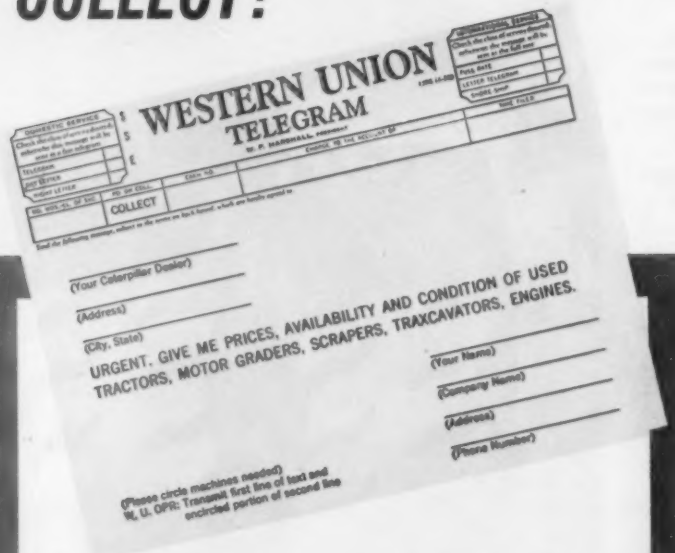

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ALPHA news and notes from the field

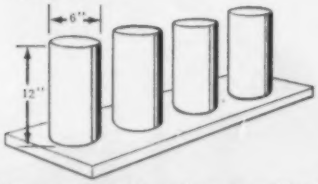
BETTER CONSTRUCTION THROUGH BETTER USE OF CEMENTS

CONCRETE TEST CYLINDERS—the right way to make them

A concrete test specimen seldom seems very important at the time it is being made. However, if trouble develops with concrete on a job, the test specimen immediately becomes a critical factor, regardless of the size of the project.

A concrete producer can guarantee concrete strength only if test specimens are made and cured according to standard methods. Concrete compression tests are made to determine concrete quality. If curing conditions, methods of sampling and methods of casting are allowed to vary, strength results are worthless because one can seldom determine whether a low strength is due to poor quality concrete or poor practices after concrete left the ready mix truck. For reliable test results, the following test procedures should be followed:

1. Use only non-absorptive molds

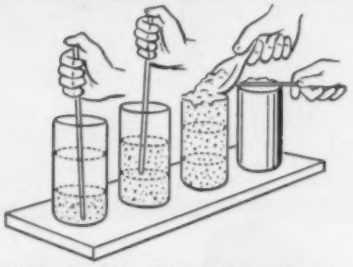


Steel, or paraffin-sprayed paper molds, 6" in diameter by 12" high, are usually used for casting concrete cylinders in the field. Before filling, they should be placed on a smooth, firm, level surface. A single strength test is generally defined as consisting of an average of 3 standard test specimens. Therefore, be sure to make at least 3 cylinders for each age test—usually 7 and 28 days.

2. Take sample from 3 parts of load

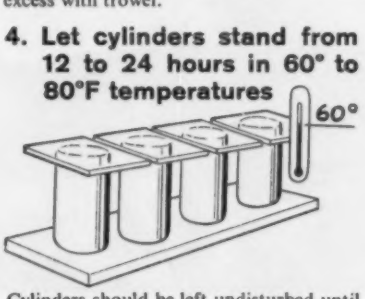
A sample should be obtained from at least 3 parts of the load and taken directly from the truck or mixer discharge. Before filling the molds, the individual portions of the sample should be thoroughly re-mixed in a large flat pan, wheelbarrow or on other clean, non-absorptive surface.

3. Fill molds in 3 layers and rod each layer 25 times



Molds should be filled in 3 equal layers, and each layer rodded uniformly 25 times with ⅝" *bullet-pointed rod.* When rodding upper layers, the rod should just extend through into the layer underneath. *All* molds should be filled uniformly—that is, place and rod the bottom layer in all samples, then the 2nd layer, etc. The 3rd layer should contain an excess. After tapping sides of mold with rod, strike off excess with trowel.

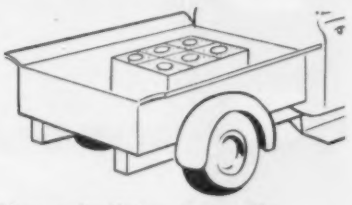
4. Let cylinders stand from 12 to 24 hours in 60° to 80°F temperatures



Cylinders should be left undisturbed until they have hardened enough to withstand handling—from 12 to 24 hours after casting. Tops should be covered with glass plates, oiled paper, wet burlap or similar material to prevent loss of moisture. The temperature should not drop below 60° or rise above 80°F *where cylinders are stored.* Cylinders left on the job for several days at low or high temperatures will give erratic results *unless carefully protected.*

5. Cure and handle cylinders with care

After setting for 12 to 24 hours, cylinders should be placed in moist curing at 70° or sent to a laboratory for standard curing. Careful handling is still necessary since cylinders which are allowed to rattle around in a box, or the back of a car, or pickup, can suffer considerable damage. Use sawdust or similar material for cushioning.



Use a bullet-nose rod

The purpose of rodding test cylinders is to compact the concrete and make it free of the large air voids which reduce strength. Too many people reach for the handy piece of reinforcing steel to rod the concrete. Some just kick the mold instead of rodding. It has been found that the bullet-nose ⅝" rod does the job best for two reasons:

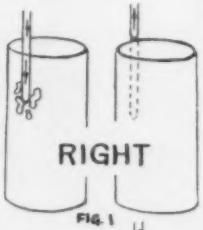


FIG. 1

a. It slides over the aggregates (See Fig. 1) instead of pushing them along as with a blunt rod and leaving large voids as the rod is withdrawn (See Fig. 2).

FIG. 3 FIG. 4

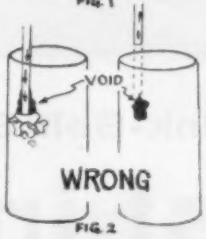


FIG. 2

b. As the rod is withdrawn, the concrete should close smoothly after it. The bullet-nose encourages this as in Fig. 3, while a square or irregular shaped tip performs as shown in Fig. 4.

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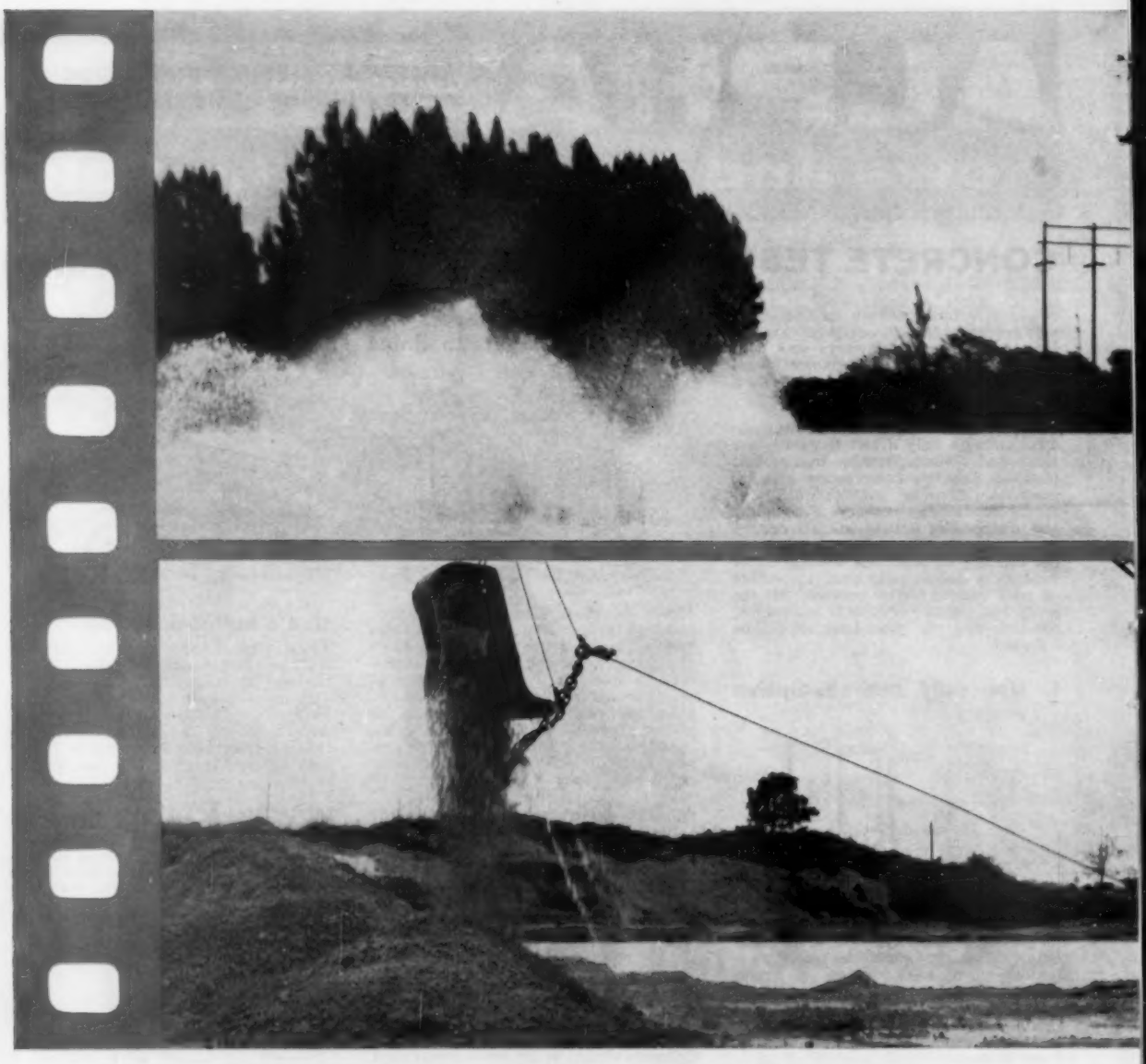

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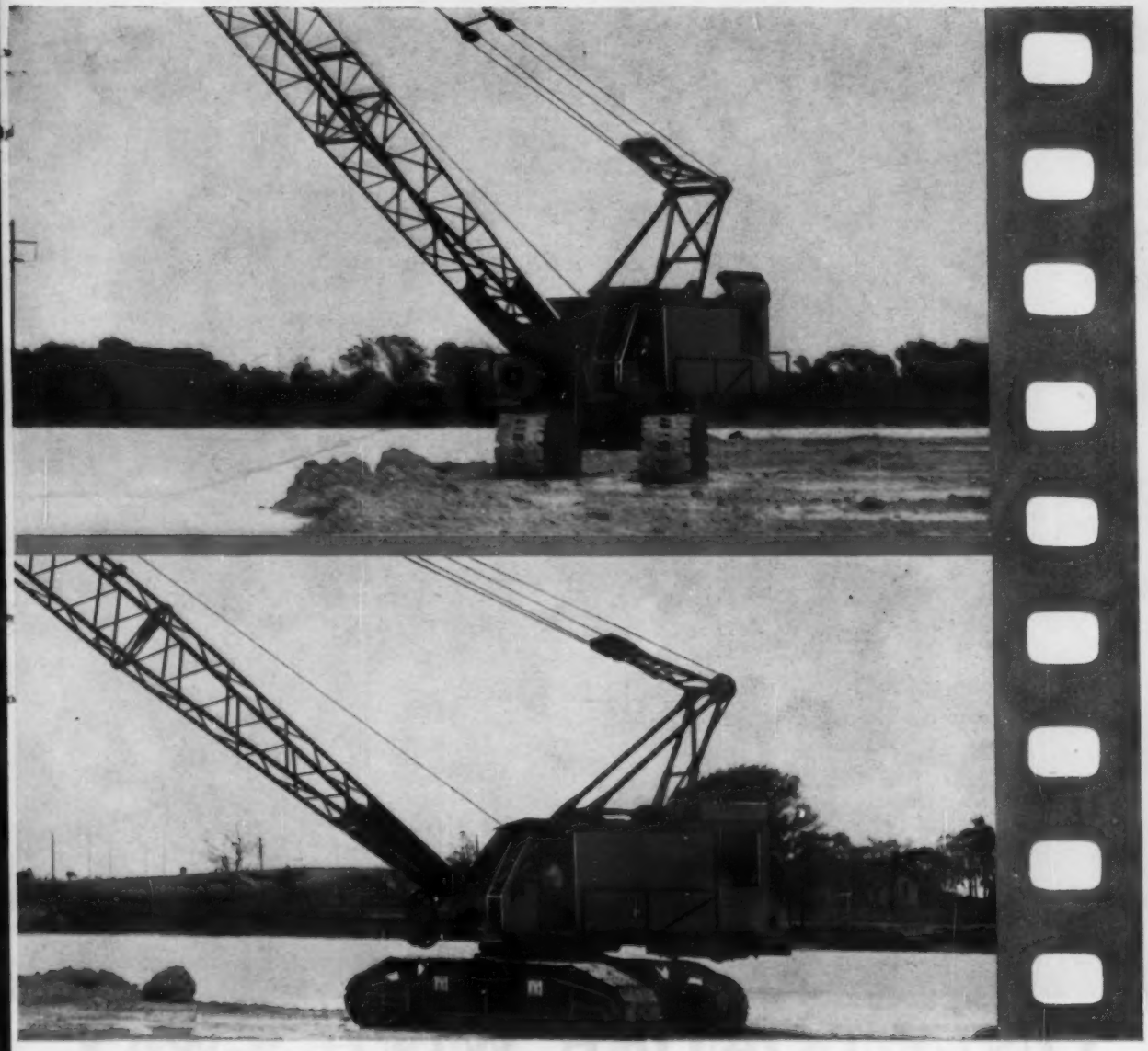

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Link-Belt Speeder K models are built in the shovel crane industry's finest plant — by its finest craftsmen.

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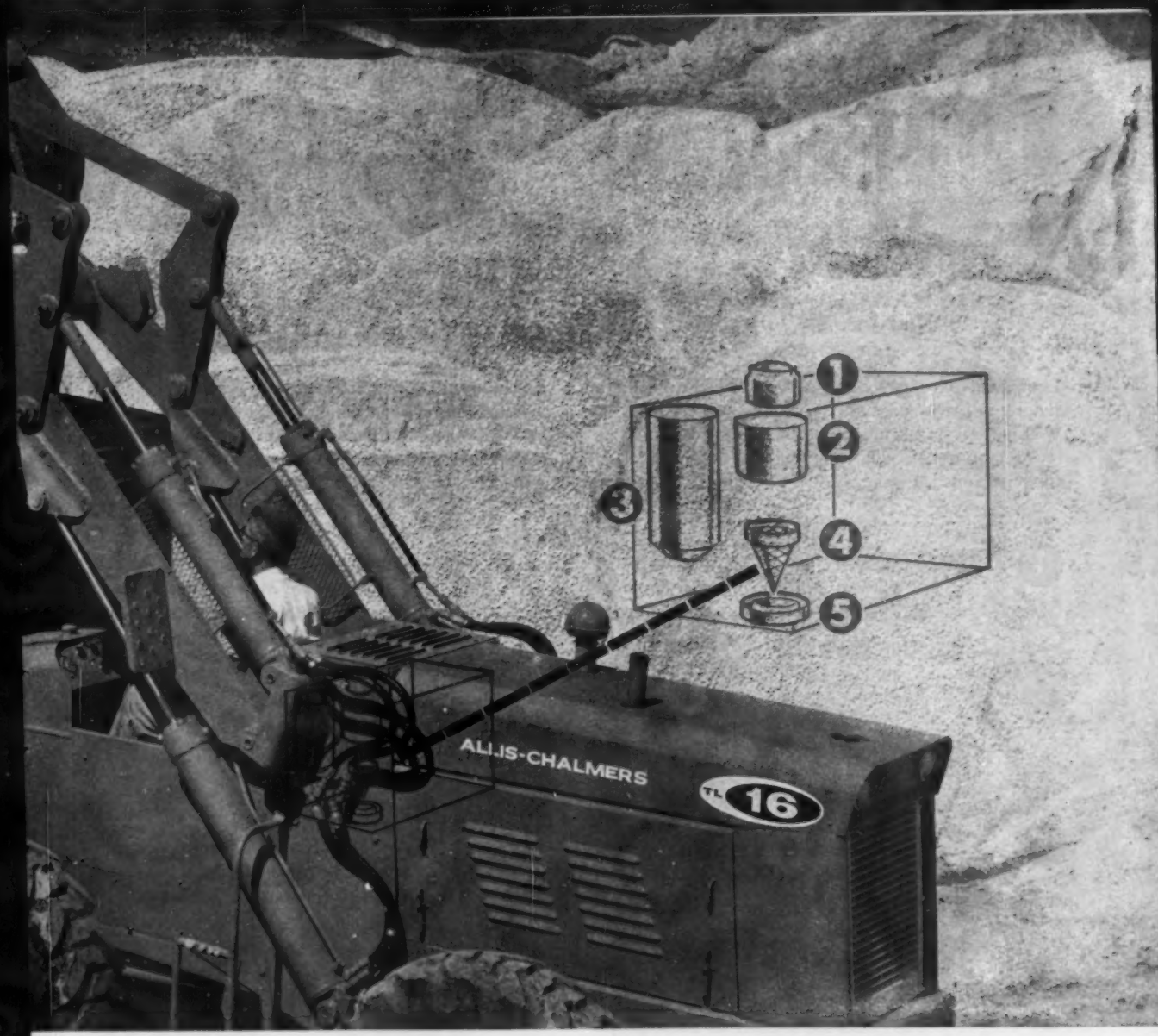
2. air filter

Hydraulic oil is cleaned by:

3. full-flow micronic filter
4. conical screen
5. magnetic filter

This 5-way filtering protection brings peak hydraulic operating efficiency . . . extended service life.

move ahead with



HYDRAULIC PROTECTION

Complete filtering protection is just another way Allis-Chalmers tractor loaders set the pace in the loader field. They also feature: *pin-connected axles* that eliminate shifting and rolling under load; *exclusive single-lever control* of all speed and direction; *safe, well-located dump cylinders* that are up and away from dirt; *extra reach* for easier dumping and *added stability* for moving big loads without tipping or spilling.

Your Allis-Chalmers dealer can give you facts on all 5 tractor loader models—ranging in capacity from 1 to 5 cu yd, in power from 76.5 to 130 horsepower. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

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LUBE LOGIC

Five tips to

Texaco "lay-away plan" protects exterior of idle equipment

Equipment that won't be needed for a while is sometimes simply parked somewhere so nobody will fall over it. Well and good, but not enough—because rust and corrosion account for almost half of what you spend on equipment maintenance. Here's a 6-step program that will keep idle equipment in cracker jack shape no matter how long it's out of use, or where it's stored. The basic ingredient is Texaco Rustproof Compound L—a remarkable product that keeps rust from starting, and acts to loosen rust that's already on the equipment.

1. Before applying Texaco Rustproof Compound L, make sure all exterior surfaces are clean and fairly dry.

2. Coat all adjustment bolts and other exposed threads with Rustproof Compound to facilitate removal or adjustment.

3. At temperatures of 65° or more, Texaco Rustproof Compound L can be applied to smooth accessible surfaces by brushing.

4. At temperatures below 65°F, or for inaccessible and complicated areas, spraying is the best way. You can thin the Rustproof Compound to a sprayable consistency by adding naphtha to form a 10 to 50% solution. Add the naphtha slowly to the compound and stir vigorously so the whole batch is the same consistency.

5. Apply tags at conspicuous points on the equipment describing the rustproofing measures that have been taken.

6. Thoroughly lubricate all equipment before storage.

Starting up equipment after storage

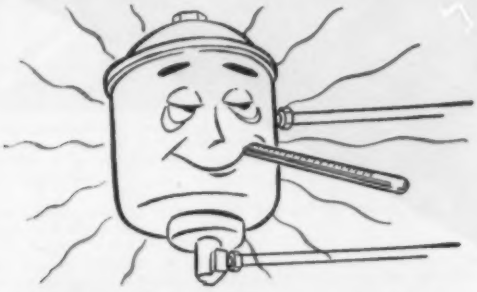
1. In most cases it's not necessary to remove Texaco Rustproof Compound L. You should, however, remove it from surfaces that will come into contact with personnel (such as ladders, seats and handles) and from surfaces that are heated to high temperatures when the equipment is operated.

2. Since Texaco Rustproof Compound L is *not* a lubricant, all working surfaces and lubrication fittings should be wiped clean before use, and the correct lubricant should be applied before starting up.

Thicker oil won't stop gear-case drooling

You can't fix leaking seals on a gear-case simply by switching to a heavier-grade gear lubricant, because in gear cases carrying heavy loads, the thicker oil simply increases gear-case temperature, which thins out the oil and it starts leaking again. Sometimes, however, foaming and leaking of gear-case lubricant indicates that the oil level is too high. By keeping vents open and keeping the oil at the recommended level, you prevent build-up of pressure which would cause leakage.

trim maintenance costs



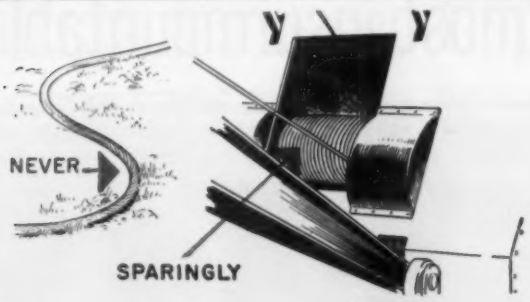
A filter that's working runs a temperature

Oil filters last so long these days it's sometimes hard to say when they were last changed. But they're so important to engine performance that it's essential that you know whether they're too full to filter right. Here's a simple way to find out.

A filter that's working will be as warm as the engine oil. If the filter on a fully warmed-up engine remains cool to the touch, it's a safe bet that it's too clogged up to let any oil through. Just to double-check, tap the filter case sharply. A metallic ringing sound means the cartridge is still in good shape. A soggy thud often means that the filter is loaded. Top mileage for even the best filter is 6,000 miles, never more.

Crawler treads are happier dry

There are few places where good lubrication is more important than in track-roll bearings, but make sure you don't lubricate the crawler treads themselves in a burst of enthusiasm. The pins that connect the links of crawler treads are designed to operate without lubrication, because dirt or other abrasives would act as a lapping compound in service. Result: much shorter service life for the track. Moral: if you don't want to lap your crawler link pins, don't oil them.



How often should you lubricate wire rope?

How much lubrication is good for wire rope and cable depends mainly on how it's used. Cables that are dragged in dirt shouldn't be lubricated at all. Oil simply holds the dirt where it can work into the strands and cause rapid wear. Cables that are wound on drums equipped with clutches should be lubricated sparingly to prevent fouling the clutch faces with lubricant. With other wire ropes, apply Texaco Crater A every 10 to 100 hours as necessary to avoid dryness. Be sure to clean the rope before adding new lubricant.

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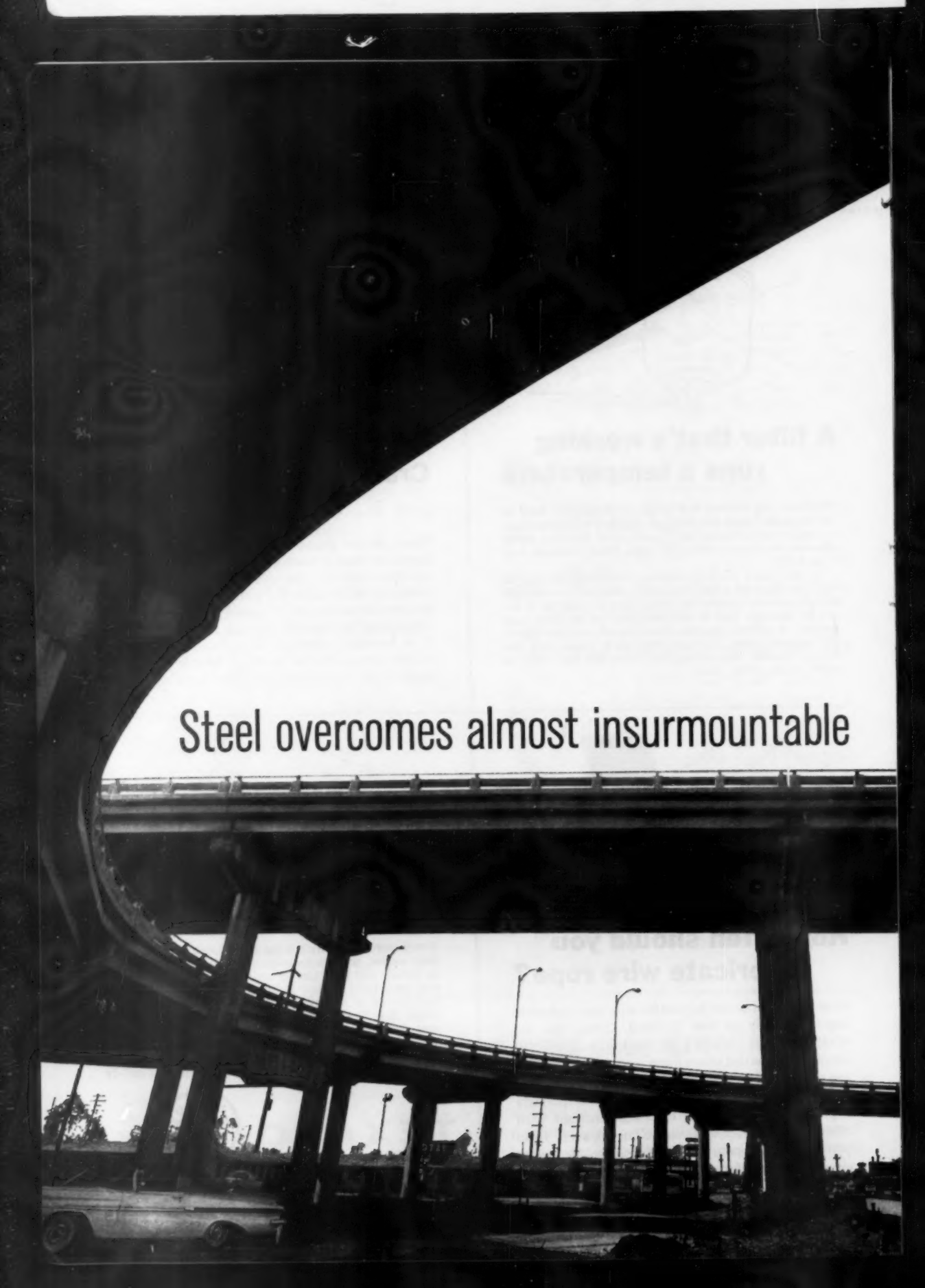
Steel overcomes almost insurmountable

Famous 4-level intersection of Greater New Orleans Expressway at Causeway Boulevard. Built over 11 railroad tracks. Fast erection, with steel eliminated serious traffic interruptions. Fabricated by American Bridge Division, using 6000 tons of structural steel.

Intersection showing construction with simple steel beams which reduced costs and saved time.

Mr. Wayne F. Palmer, President, Palmer & Baker Engineers, Inc., Admiral Wm. H. Smith, Vice President and Chief Engineer, and Mr. Kenneth C. Roberts, Assistant Chief Engineer for Design.

USS Steels for Bridge Design

Structural Carbon Steel 33,000 psi minimum yield point	**USS MAN-TEN High Strength Steel** 50,000 psi minimum yield point
USS TRI-TEN High Strength Steel 50,000 psi minimum yield point	**USS "T-1" Constructional Alloy Steel** 100,000 psi minimum yield strength

obstacles in short-span bridge design

at Palmer & Baker Engineers, Inc., Mobile, Ala.

If you want to see how seemingly impossible bridge and highway problems were solved with steel, take a trip around New Orleans and east along the Gulf Coast. In this area, the consulting engineering firm of Palmer & Baker has designed some of the most interesting structures in the country. Last year, with a staff of about 400 people, they handled approximately $155,000,000 worth of Interstate Highway and Bridge projects.

One of their most difficult projects was a 4-level highway interchange and railroad grade separation located on Causeway Boulevard and the Greater New Orleans Expressway. Eleven railroad tracks that couldn't be moved ran through the area. The use of steel permitted the interchange to be built without interrupting railroad traffic. Highway traffic amounts to an average of 65,000 cars daily.

Here is a practical example of the versatility of steel structural members. No difficulty was encountered in moving steel into position and the traffic flowed through without tie-ups. Certainly any other method of construction would have been not only impracticable but considerably more expensive.

Recently Palmer & Baker completed plans for a proposed 78-mile superhighway traversing undeveloped bayou country of Southern Louisiana. The highway will be built literally on top of a swamp. Each of the 18 bridges will be of steel, including the pilings set in the swamp.

Basic advantages of steel construction.

Steel saves time in both engineering and construction.

Steel saves money by reducing foundation costs and speeding up construction.

Steel permits greater clearance, or the same clearance with lower approaches.

Steel can be transported easily and economically to the site.

Steel of the high strength, corrosion-resisting types saves weight, reduces painting costs and cuts foundation costs.

Steel is readily available in any part of the country.

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USS

This mark tells you a product is made of modern, dependable Steel.

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MANITOWOC 4500 VICON®

the only *really new* excavator design since steam!

The Manitowoc Model 4500 VICON represents the most outstanding advancement of excavator design in decades. Here is a 6 yard shovel or 7 yard dragline incorporating new, tested design principles to give you more yardage in less time than any other mechanical or electrically driven shovel-drag in this size range. Thoroughly proved on the job for over three years, VICON design has increased yardage 25% or better, substantially reduced maintenance costs, and piled up more profits for owners. Some exclusive VICON features are:

INTEGRATED CONTROLS that serve both as clutch operating levers and as engine throttles, providing variable speed control over each function. Clutches, being responsive to lower range of control pressures, are engaged before engines are accelerated. Slippage and overheated friction surfaces are eliminated, lengthening clutch life appreciably.

HOIST AND DRAG DRUMS ARE INTERLOCKED to automatically synchronize their operation. Cycle time is faster and output is greater because full horsepower is always available for hoist—the operator doesn't "soak" it up with the drag brakes. Operating costs are noticeably less because brake use is cut by 50% and lining wear is drastically reduced. Another advantage of the VICON interlocked drum arrangement is that the operator can "power lower" or free-cast the bucket.

DUAL INDEPENDENT ENGINE POWER with one engine powering the main drums, and the second all other functions. Here are all the advantages of electric or conventional diesel engine mechanical drive without the disadvantages of each. You get the performance characteristics of electric drive — smoother power flow, variable independent speed control, simultaneous operation of dig, hoist, swing, and propel functions—without sacrificing mobility, without incurring the headaches and special maintenance problems of electric drive, without needing a separate power source at every job site. You get the simplicity of mechanical drive without losing valuable production time because of engine "lug down", without needing to jam clutches into engagement at high and harmful engine speeds, without the limitations of operating speeds that are inherent in conventional diesel engine drive.

Why not get the complete story on the *sensational* Model 4500 VICON today? Your nearby Manitowoc distributor has all the facts.

MANITOWOC

8-A * Variable Independent Control

Manitowoc

MANITOWOC ENGINEERING CORP.
(A subsidiary of The Manitowoc Company, Inc.)
Manitowoc, Wisconsin

SHOVELS	CRANES	DRAGLINES	TRENCH HOES
1¼ — 6 YDS.	25 — 125 TONS	1¼ — 7 YDS.	1¼ — 3 YDS. ●

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ALLIED Jet Seal

THE ORIGINAL TWO-COMPONENT POLYSULFIDE POLYMER ELASTOMERIC JOINT SEALING COMPOUND

IS THE SPECIFIED SEALANT IN MAJOR CONSTRUCTION PROJECTS ACROSS THE NATION*

Specified by highway departments the nation over, Allied JET SEAL, Product 9015H, is the most effective concrete joint sealant ever devised.

Together with the exclusive Allied Applicators, Models 8591-D and X691-E, JET SEAL gives economy of application, durability and exceptionally long life.

- JET SEAL is improved in adhesion, cohesion, resilience and low-temperature ductility (-20°F).
- JET SEAL has no gravity or cold flow tendencies even at 200°F or more.
- JET SEAL will prevent incorporation of incompressible materials.
- JET SEAL is quick-curing. Construction can be opened to all traffic within one hour.

* These highway departments specify Allied JET SEAL:

California
Connecticutt
Georgia
Minnesota
New Mexico
North Carolina
Rhode Island
South Carolina
Tennessee
Texas
Utah
Virginia

New York Dept. of Public Works

For more information, write to:

ALLIED BUILDING • 5101 N. PENNSYLVANIA • P.O. BOX 7278
39TH STREET STATION • OKLAHOMA CITY, OKLA.
PLANTS: STROUD, OKLA. • DETROIT, MICH. • LOS ANGELES, CALIF.

ALLIED MATERIALS CORP.

PRODUCERS, REFINERS AND COMPOUNDERS OF SPECIAL ASPHALT AND COAL TAR PRODUCTS

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"We drilled over 5,000 ft., averaging 15 redresses per bit, with Timken® carbide insert bits"

Special report from Rogers Construction Company

LOCATION: U. S. HWY. 30, THE DALLES, OREGON

Operating conditions:
Lava-Basalt

In converting part of U. S. 30 from a two-lane to a four-lane highway, Rogers Construction Co. of Portland, Ore., had to drill through Lava-Basalt. Holes in this very fryable rock varied from 25 to 60 feet. And for drilling on this very abrasive ground, Timken® carbide insert bits were a "natural". They set records. Some of the original 010 4½" bits have drilled well over 5,000 ft., averaging 15 redresses per bit.

Which Timken Bit should you use?

In hard, abrasive ground, the Timken carbide insert bit gives you greatest economy. But in softer ground, use the low-cost Timken all steel multi-use bit. Both bits are interchangeable in the same thread series; you can switch bits as the ground changes. What's more, dozens of different Timken bits fit the same drill steel. And both types are made from Timken electric furnace fine alloy steel, have special shoulder unions to protect against drilling impact. Let us help you select the right Timken bit for your job. Call or write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

TIMKEN®
removable rock bits

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ROADS AND STREETS
Sixty-Eight years of Editorial Leadership

Washington News Letter

By Duane L. Cronk, Director, Highway Information Services, Inc.

October, 1960

A 33% increase in productivity of central mixing plants may be possible in Ohio with reduction of the state's required mixing time, from 120 seconds to 90 seconds, a BPR report released here last month indicates. A team of engineers from the agency has been in Ohio to evaluate the effect of the change on productivity and quality of Portland cement concrete. The engineers found:

That quality apparently is unaffected by the shorter mixing time and unit costs may well be lowered as a result.

That central mixing is more popular than heretofore, since the advent of the large Interstate jobs. About one-third of the concrete for road jobs in Ohio is central mix now - amounting to 2 million sq. yds. in 1959.

That considerable savings are possible by elimination of the requirement for agitation of mix during haul, even up to distances of 6 miles. Segregation is prevented by use of box spreaders.

Formal endorsement of the objectives of the roadbuilding industry's public information campaign through the Better Highways Information Foundation came last month from the American Association of State Highway Officials. The Executive Committee of AASHO lauded the public service undertaking to publicize "the need for and benefits of better highways" and urged the individual state highway departments to help implement the program at the local level. (See story on page 95)

* * *

The big trucks will stop rolling over the Illinois Test Road next month. Already, the statisticians, with a baffling array of electronic computing equipment, have moved in, to analyze literally millions of pieces of data on performance of asphaltic and Portland cement concrete under various loads. A fleet of vehicles of various weights have been running around the test loops of the AASHO project for two years, for a total of more than one million "impressions". After next month, the U.S. Army will take a crack at the test bridges with its mammoth military vehicles.

Final results of the $22-million experiment will be six months in the developing. As per an iron-bound agreement prior to the test, nothing official will be released prematurely.

Meanwhile, the 50 state highway departments are feeling their way toward a continuing cooperative research program which could solve other major problems. The Test Road was a tremendously complex undertaking, and it posed numerous unforeseeable difficulties. But it demonstrated that the states can get together in a

(continued on next page)

common search for knowledge in highway construction, engineering, and administration. AASHO leaders are talking now about establishment of a revolving fund, to which each state would contribute annually, and out of which money could be drawn for needed research activities.

A study of highway planning on the county level has been completed by the National Association of County Officials. NACO found that there is an encouraging increase in long-range planning of highway improvements among the nation's more than 3,000 counties, and also that state highway departments are coming to the aid of those most progressive ones with financial and technical assistance. Although states are reluctant to make direct planning grants to the counties, they are willing to tackle studies on behalf of counties which would permit development of sound construction programs. (Report available from NACO, 1001 Connecticut Ave., Washington, D.C.)

An award to be made for outstanding accomplishment in the roadbuilding field has been announced by the American Road Builders Association. ARBA is accepting nominations for the first annual presentation in 1961. Contractors who have distinguished themselves for leadership, ingenuity, or achievement are good candidates.

* * *

A survey of state legislative action in highway matters has been released here by the National Highway Users Conference. Some of the highlights from the NHUC poll:

> Three states boosted their motor fuel tax to 7¢ a gallon, thus bringing to 16 the number of states at that level (Alaska, R.I., and Va.).
>
> Two states created new toll authorities to construct facilities (Ky. and N.Y.)
>
> Seven states took action on highway bond issues, also to finance additional highway work. They are: Alaska ($23 million), Kentucky ($100 million), Massachusetts ($86 million), Michigan ($10 million), Mississippi (authorized counties to issue road and bridge bond issues, repayable within 20 years from their share of the state user revenues), Rhode Island ($200 million), and West Virginia ($5 million).

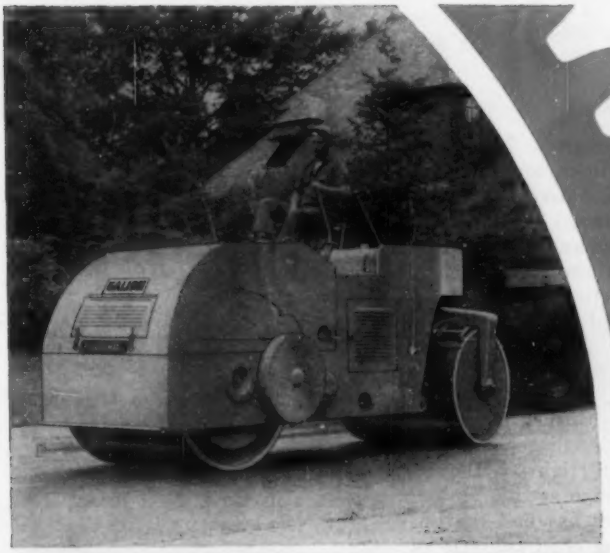
Imposition of additional highway taxes will be a fiercely contested issue in many more states next year when nearly all of the legislatures will be in session. To block such measures the petroleum industry has already launched a "down to the grassroots" publicity campaign. Heavy expenditures will be made during the next six months for newspaper, radio, and service station advertising particularly.

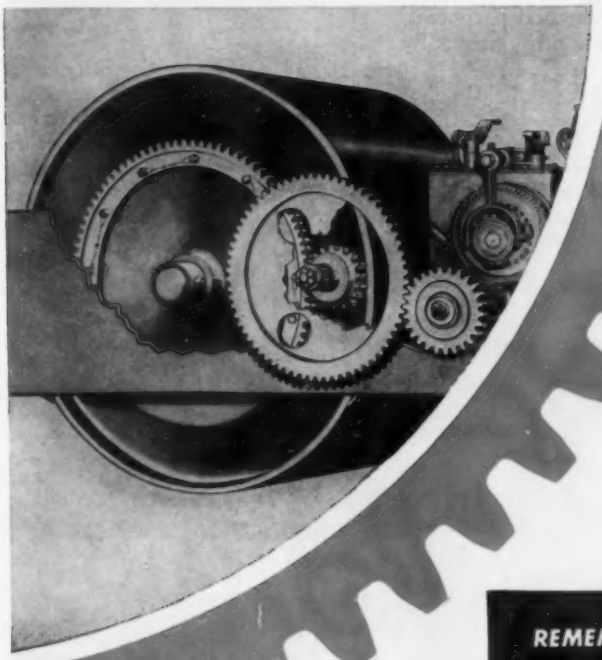
* * *

A good example of how industrialists feel about the new expressways came out of Dallas, Tex., last month where roadbuilders have just completed an 8-mile stretch of the 16-lane Stemmons Expressway (including 6 lanes of separated service roads).

Operators of two major industrial districts in the path of the big road donated 180 acres of land reportedly worth $750,000 for right-of-way. Their guess is that the new route will take through traffic off the over-burdened road now serving their plants and will expedite transportation of goods into and out of this major distribution center.

Note to equipment and materials producers: The Secretary of the Army has been named sole purchasing agent for construction and automotive supplies for all of the defense services. The Army will buy all such items as construction equipment, diesel engines, repair parts, tires, engine components, etc.





YOUR GOOD MECHANICAL JUDGMENT

will recognize the following features of Galion Tandem Roller Final Drive as sound, performance-proved, time-tested engineering.

- GALION FINAL DRIVE GEARS are all *Spur Gears.*
- GALION FINAL DRIVE is a 2 *step* gear reduction train thru 4 spur gears — a straight-line drive.
- GALION FINAL DRIVE *greatest* gear ratio is only 5 to 1.
- GALION FINAL DRIVE spur gears are special alloy steel, accurately machine cut and heat-treated. No ordinary, uncut, cast gears are used.
- GALION FINAL DRIVE has *no small beveled pinion gear* driving a *large bevel ring gear* on the roll.

IF YOU KNOW YOUR GEAR MECHANICS

you know that *gradual* reduction and low speeds (each gear with roller bearings) plus a straight-line spur gear train, give the least friction and consequently have the least gear wear. That is why Galion Final Drive gears *stay in line,* wear the least, and consequently last longest without adjustment or replacement.

REMEMBER! ROLLER *RELIABILITY* – depends largely on its FINAL DRIVE mechanism

SPUR GEAR GALION FINAL DRIVE

TANDEM ROLLERS

THE GALION IRON WORKS & MFG. CO.

General and Export Offices — Galion, Ohio, U. S. A. Cable address: GALIONIRON, Galion, Ohio

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People

GORDON M. JONES, assistant vice-president and director of construction of The M. W. Kellgog Company of New York, has been elected a member of the Executive Committee of the National Constructors Association, a trade group of industrial engineering and construction firms.

STEPHEN D. BECHTEL, president of Bechtel Corporation, San Francisco, has been selected as the 1961 recipient of the John Fritz Medal, which is awarded annually for notable scientific or industrial achievement in the engineering profession, the John Fritz Medal Board of Award announced here.

One of the highest honors bestowed by the engineering profession, the award was established in 1902 to perpetuate the memory of the late John Fritz' achievements in industrial progress. It is sponsored by the American Society of Civil Engineers, American Institute of Mining Engineers, the American Society of Mechanical Engineers, American Institute of Electrical Engineers and the American Institute of Chemical Engineers.

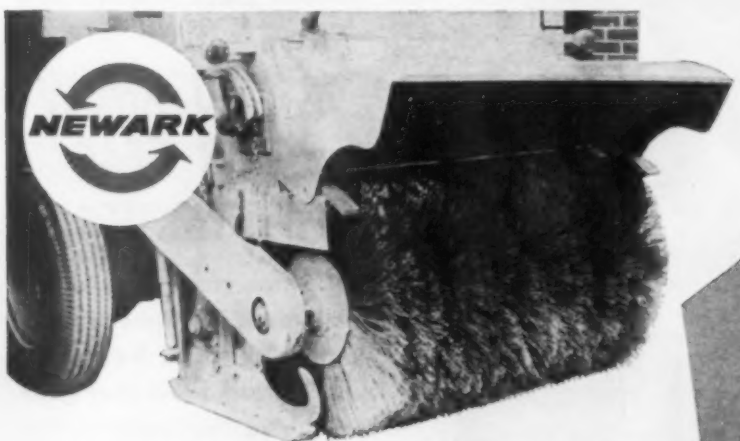
THOMAS H. CUTLER recently urban engineer-manager for the Kentucky State Highway Department, has retired at age 77.

"Tom" Cutler has had the distinction of being chief engineer of two different highway departments, those of Missouri and subsequently Kentucky.

CHARLES G. GROSVENOR, JR., of Denver, is appointed District Engineer for the Asphalt Institute at Santa Fe. President J. E. Buchanan of the Institute said Mr. Grosvenor will provide engineering service for New Mexico and west Texas under the supervision of Division Managing Engineer Hugh A. Wallace at Dallas.

ROBERT B. RICHARDS has been appointed chief engineer in charge of the newly opened office of De-Leuw, Cather & Company, Engineers, at Newark, New Jersey. The firm's headquarters is in Chicago.

D. W. DAVIS, state maintenance engineer with the North Carolina State highway department, is retiring after 40 years of service with the department. He is succeeded by Lawton Gunter who has been assistant maintenance engineer.



Here's why! . . . New, round brush wire, permanently locked in place and uniformally distributed by Danline's unique construction, produces the wearing and sweeping qualities you are looking for . . . In addition to longer life, you can remove up to 10" of sand in a single pass — even handle heavy loads of dirt, snow, gravel, etc. . . . Danline has been test-proven over countless thousands of sweeping miles by hundreds of municipalities . . . Write or call for complete, illustrated brochure, then watch your Danline and see for yourself!

Newark Brush Company

59-1

260 MICHIGAN AVENUE
KENILWORTH, NEW JERSEY

One DANLINE Outwears 15 Fibre Brooms*

*U.S. Pat 2864112

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Where heavyweights move job records prove... FIRESTONE STAMINA KEEPS PROJECTS ON SCHEDULE!

That sure-fire stamina of cord and rubber in Firestone off-the-highway tires pays off *big*. These dependable tires keep costly equipment on the go and meet tightest schedules. Such exclusives as Firestone Rubber-X—longest-wearing rubber ever built into Firestone tires—and Firestone Shock-Fortified nylon cord—that takes the most gruelling impact punishment in stride—see to that! Another plus: Firestone's Giant Tire Service stands back of every Firestone tire, and a Firestone Tire Expert will match tires to specific project needs and handle your tire maintenance problems. For more worktime and less downtime, see your Firestone Dealer or Store. Or write: Manager, Off-The-Highway Tires, The Firestone Tire & Rubber Co., Akron, Ohio.

ALWAYS SPECIFY FIRESTONE TIRES WHEN ORDERING NEW EQUIPMENT

Super Rock Grip Wide Base* Super Rock Grip Deep Tread*

TUBELESS OR TUBED

Firestone

BETTER RUBBER FROM START TO FINISH

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*Firestone T.M.

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ALL OVER THE U.S.A., CONTRACTORS

power-steer and power-shift

NO ATTACHMENT! NO AFTER-THOUGHT! NO "STOP-GAP"!

Exclusive, years'-proven combined Planet Power-steering and Hi-Lo power-shifting are designed-in, built-in, basic standard equipment of the new 230-hp International TD-25!

Simplified TD-25 design is the only planetary system engineered and located to give you the dual advantages of "live track" steering and on-the-go shifting!

"Live track" Planet Power-steering eliminates load-limiting "dead-track drag"—gives power to pull full loads on turns, as well as on straight-aways. On-the-go, Hi-Lo power-shifting does away with time-wasting "gear-shift lag"—lets you match power to load instantly for full-speed cycles!

No wonder the new TD-25 can outearn king-sized clutch-steered crawlers up to 50%—on push-loading; land-clearing; overburden removal; benching; "mass-production" dozing; ripping; other tough jobs!

New TD-25 seven-roller tracks are strength matched to the full effort of the new 230-hp diesel engine. The "25" is platformed on super-rugged double-box beam frames—and is smoothly carried on International's dual-protected Dura-Rollers, the track rollers that make 1,000-hr lube intervals practical!

Power-shift and power-steer the "25" with king-sized loads—around curves, upgrade, anywhere. Compare the advantages of getting this exclusive performance, and getting it from years'-proven standard equipment. Prove what's behind the "25's" rapid rise to nationwide contractor acceptance. Let your International Construction Equipment Distributor demonstrate!

Though "out-rated" 105-hp by a king-sized, clutch-steered competitor, this nimble TD-25 proves able to outwork "the big one"—side-casting and benching to build Pacific Northwest mountain logging roads!

International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

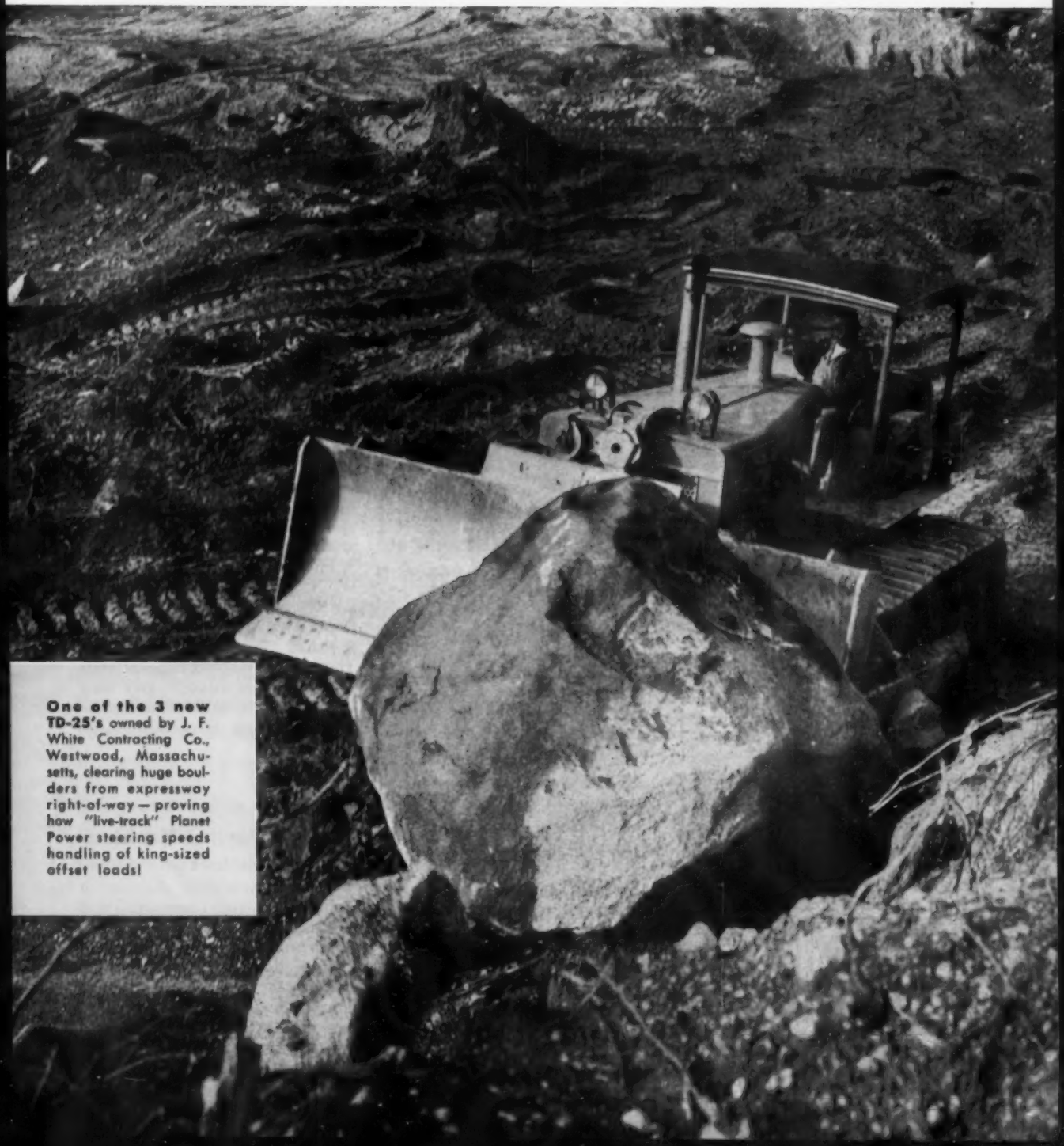
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

Three new International TD-25's of contractor V. E. Posey's fleet team up to prepare homesites from a mountainside—near San Diego, California. Dual-valving of the "25's" direct-start DT-817 engine provides for peak turbocharging efficiency—to deliver full-rated performance, from sea level to timberline!

Cleaning the face of a Missouri strip mine behind a big dragline, this TD-25 pushes "tractor-sized" boulders aside with the greatest of ease. This "25" also builds dragline walkways and haul roads—and drastically cuts land-clearing costs for Peabody Coal Co.

For cycle-speeding push-loading, TD-25 power-shifting helps give "feather-touch" contact; maintains solid push-block contact on curves; gives gear-higher kick-outs than ordinary. The two "25's" tandem pushing the International 295 Payscraper®, and the third one ripping, belong to superhighway contractor Ed Bentley, Sylacauga, Alabama.

with TD-25 standard equipment!



One of the 3 new TD-25's owned by J. F. White Contracting Co., Westwood, Massachusetts, clearing huge boulders from expressway right-of-way — proving how "live-track" Planet Power steering speeds handling of king-sized offset loads!

New Publications

On Chemical Mixtures

The Calcium Chloride Institute, recognizing the need for a basic data booklet on the use of storage of de-icing chemical mixtures and procedures for mixing, has published "Calcium Chloride and Salt Mixtures." Copies are available on request to the Institute at 909 Ring Building, Washington 6, D. C.

In recent years, notes this book's preamble, there has been greater need to achieve clear, dry pavements quickly after winter storms, and at low cost. Chemical mixtures were first used by toll road officials who sought new means of clearing pavements fast. The trend toward their use has become increasingly stronger; now adopted by state highway departments, and county and municipal maintenance organizations.

HI-WAY Model E Spreader

FOR ICE CONTROL

Fast, one-man operation, fewer reloads, better traction, 4 to 40 ft. spreads of sand, salt or cinders!

3 Different Models Available: Truck mounted with PTO drive — easy to operate, economical to use. Truck mounted, engine powered (hydraulic drive available) — for more accurate, positive spreads. Dump body mounted, engine powered — use one of these lower cost rigs with several trucks, on or off truck in minutes. Capacities up to 8.8 cu. yds. mean fewer trips to the stockpile. Wide conveyor and steep 45° sides prevent bridging.

Other Model E Features
- 24" heavy duty conveyor
- 20" spinner with replaceable fins
- Removable inverted "V" over conveyor on 13 and 15' models
- Complete control from cab
- Accessory equipment for every need

HI-WAY SPREADERS Sales & Service

Protect Today's Motorist Through Better Ice Control

HIGHWAY EQUIPMENT COMPANY

605-C "D" Ave. N. W. • Cedar Rapids, Iowa

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Treatment of Abrasives

A new manual has been published on "Calcium Chloride for Abrasive Treatment in Winter Maintenance." It includes data on calcium chloride, recommended procedures for treating and storing abrasives, applying and spreading abrasives. It also contains helpful charts on the melting action of calcium chloride, and distances required to stop on icy pavements. It is available free, on request to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

Paving Performance

Pavement Performance Concepts. Bulletin 250, Highway Research Board, 2101 Constitution Ave., Washington, D.C. Price $1.40. The bulletin contains major reports on: Preliminary analysis of road loading mechanics, Highway characteristics as related to vehicle performance, and the pavement serviceability-performance concept.

The last-mentioned subject, by W. N. Carey, Jr., Chief Engineer for Research and P. E. Irick, Chief, Data Analysis Branch, Highway Research Board, AASHO Road Test, describes how a panel of highway users were asked to give their personal rating to the "serviceability" of various sections of pavement.

Asphalt Paving Booklets for Contractors

To help stimulate the use of asphalt for paving commercial and off-street parking areas, residential streets and driveways, The Asphalt Institute is offering to interested asphalt contractors various promotional aids. In addition to an ef-

Continued on page 30

More work out of trucks ... at Lower Cost?

EATON 2-SPEED AXLES WILL DO IT!

On-the-job performance records prove that trucks equipped with Eaton 2-Speed Axles make quicker trips, travel more miles at lower cost per mile. By providing *double* the conventional number of gear ratios—the right gear ratio for every road and load—they reduce stress and wear on engine and power transmitting parts; permit engines to run efficiently under all operating conditions.

Eaton's exclusive features, including forced-flow lubrication, planetary gearing, and Inductalloy Axle Shafts, add thousands of miles to axle life, and eliminate costly maintenance expense worries.

Ask your dealer to explain how Eaton 2-Speed Axles reduce hauling costs, add to profits, and make trucks worth more on the trade-in.

EATON
2-SPEED
AXLES

More than 2 Million Eaton Axles in Trucks Today

EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND 10, OHIO

PACAL

You can see
It's Pacal

T.M. Reg. U.S. Pat. Off.

Buy Pacal Heat Treated Plow Bolts, too. They have triple strength and hardness. They will not loosen or stretch and heads will not wear off. Especially developed to provide the longest wear required by Pacal X-TRA-EDGE BLADES.

Also available
⅞" heavy duty section
with ⅝" top

PAPER, CALMENSON and Company

BLADES

the popular choice

County Highway Official, Iowa—"After one year's use new Pacal blades have saved our county 40 to 50% in blade and bolt costs."

County Highway Engineer, Iowa—"Special hardened blades very satisfactory here. Switching to this three-piece arrangement 100%."

County Highway Official, Minnesota—"380 hours on machine before blades were worn out."

County Highway Superintendent, Indiana—"Results very good . . . getting 4 times the wear over old ⅝" x 6" double bevel curved-blades."

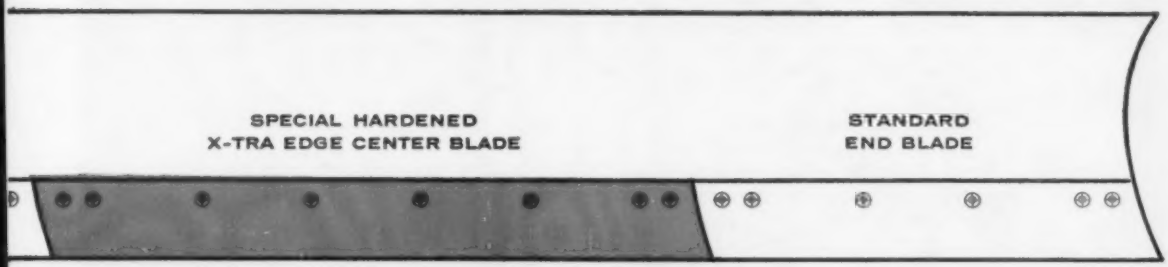
County Highway Official, Iowa—"Very pleased with new three-piece blade . . . receiving four times the wear of blades previously used."

State Highway Engineer—"Have used 15 sets of ½" to ¾" x 8" blades. They wear very straight and 50-60% longer than ½" x 8" blades."

County Highway Official, Missouri—"Pacal ½" to ¾" x 8" special hardened blades giving about 5 times more wear than ½" x 6" blades."

County Highway Superintendent, Ill.—"Using ½" to ¾" x 8" blades and know they outlast 5 to 6 pairs of ½" x 6" double bevel curved blades."

City Street Commissioner, Missouri—"Three-piece ⅝" to ⅞" x 8" hardened blade wearing 5 to 6 times as long as ½" x 6" double bevel curved blade."



Profile of Pacal X-TRA-EDGE BLADE shows how you can get more steel on the wearing edge with no increase in waste. New Pacal hardened center section resists crowning, makes your blades wear two to six times longer, cutting blade costs even more. Join the number of satisfied users—write or call Pacal!

County Road B and Walnut Street adjoining Highway 36, St. Paul 13, Minn.

Telephone Midway 6-9456 • Branches in Duluth, Minn. and Billings, Mont.

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CIRCULAR 880

New Publications

Continued from page 26

fective advertising kit (includes ad mats, radio platter and TV film strips for newspaper, radio and television promotion), a select list of booklets is available.

These booklets are: *Asphalt-Paved Driveways,* 20 cents per copy; *Asphalt-Paved Residential Streets,* 20 cents per copy; *Asphalt-Paved Parking Areas,* 25 cents per copy; and *Specifications and Construction Methods for Asphalt Curbs and Gutters,* second edition, 10 cents per copy.

Interested contractors can secure copies by sending in to The Asphalt Institute, College Park, Maryland.

DICTIONARY OF THE HIGHWAY TRAFFIC by J. Stannard Baker and William R. Stebbins, Jr., published by the Traffic Institute, Northwestern University, 1804 Hinman Avenue, Evanton, Ill., 300 pages, illustrated, cloth bound, $6.00.

This book brings together in one volume, for the first time, the many technical vocabularies in the general highway traffic field. The main purpose is to improve communication among technical and specialized groups in the highway traffic field.

Terms and definitions were compiled from over a score of authoritative texts and glossaries.

A SIMPLIFIED STUDY of the basic principles of geodesy and geodic surveying, prepared by the U. S. Air Force, the study is divided in five parts; development of Geodesy, Figure of the Earth, Principles of Geodetic Surveying, Geodetic Systems, and Developing a World Geodetic System.

Geodesy For the Layman. Geo-Sciences Branch, Aeronautical Chart and Information Center, U. S. Air Force. Oct. 1959. 83 pages, including programs and maps. (Order PB 161372 from OTS., U. S. Department of Commerce, Washington 25, D. C., $2.25.

SNOW AND ICE CONTROL WITH CHEMICALS AND ABRASIVES. Bulletin 252, Highway Research Board, 2101 Constitution Ave., Washington, D. C. Price 80 cents.

This bulletin contains two recent papers. One by C. H. Lang, chief engineer, New York Thruway Authority, with W. E. Dickenson, Calcium Chloride Institute, and one by D. R. Brohm of the Ontario Department of Highways with H. M. Edwards of Queens University, reviewing results of field and laboratory results.

Continued on page 32

WHAT SIZE DO YOU NEED?
There is a Williams digger designed specifically for your hole digging project. From small diameter shallow holes for telephone and power line construction to large diameter deep shafts with underreamed sections for caisson foundation installations, there is a Williams machine designed to do your work.
All Williams diggers feature:
• Separate high speed throw-off fa[illegible]es
• Power crowd for rapid penetration
• Simplicity of design for operating and maintenance ease.
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2101 Corinth St. • Dallas, Texas
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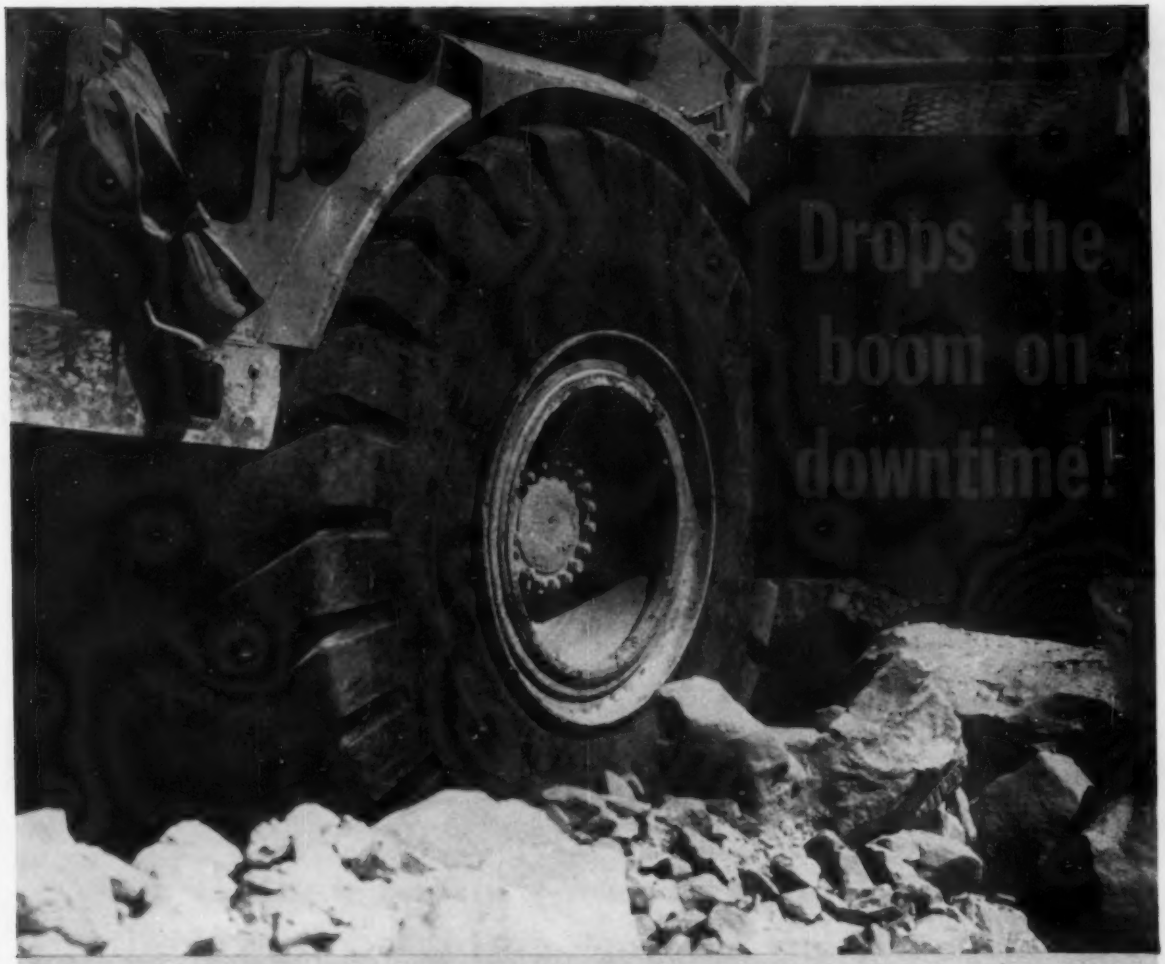

THE NYGEN-BUILT

GENERAL TIRE

...is made stronger to roll longer on the toughest projects you can name

Name the toughest jobs going today... and it's a cinch the General Tire is on the scene. Engineered with stronger-than-steel Nygen cord, Generals end delays caused by extreme temperatures and rugged field conditions. This is the kind of performance that lowers the boom on downtime ... the kind of performance you can't afford to be without.

THE GENERAL TIRE & RUBBER CO. • AKRON 9, OHIO

. . . for more details circle 302 on enclosed return postal card

Gardner-Denver RP600 rotary portable compressors at work on sewer job.

Work'em anywhere — in any weather
Gardner-Denver rotary portables can take it

You can depend on Gardner-Denver rotary portable compressors to deliver the air you need in any weather—any climate, any altitude. They are ruggedly built, run smoothly, cost little to maintain. Six capacities from 85 to 900 cfm. Write for Bulletin RC-1. See your Gardner-Denver distributor soon.

All-weather operation—assured by efficient cooling system.

No dry starts in cold weather—clutch on RP125 and larger sizes assures full lubrication when compressor is engaged.

Thrifty—"THRIFTMETER"® fuel control regulates engine to meet air demands.

Easy to maintain—rotors and blades can be inspected and changed in minutes.

Gardner-Denver RP900 rotaries provide power for 5½" drills on Niagara power project.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

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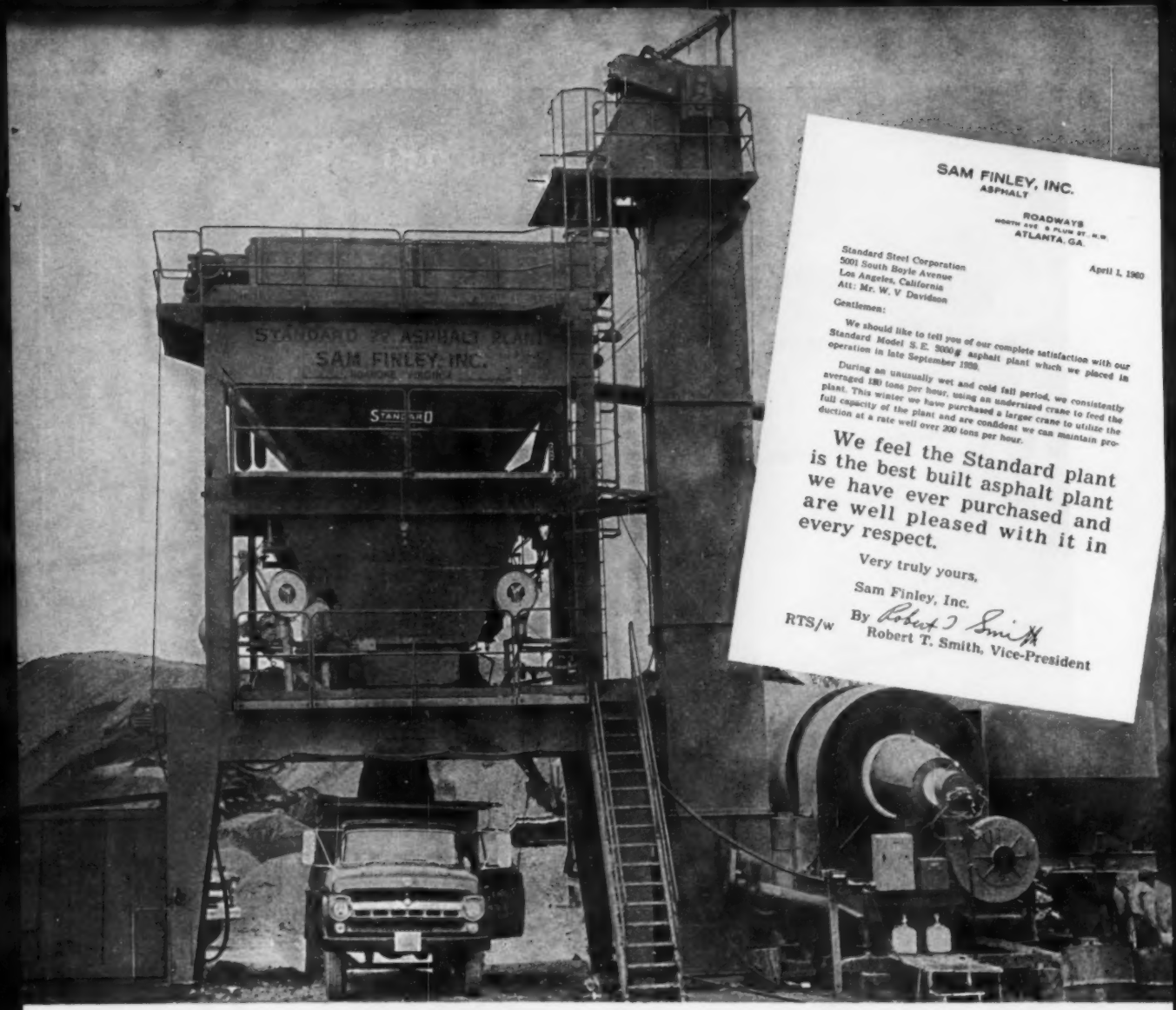


SAM FINLEY, INC.
ASPHALT

ROADWAYS
NORTH AVE. & PLUM ST., N.W.
ATLANTA, GA.

Standard Steel Corporation
5001 South Boyle Avenue
Los Angeles, California
Att: Mr. W. V Davidson

April 1, 1960

Gentlemen:

We should like to tell you of our complete satisfaction with our Standard Model S.E. 5000# asphalt plant which we placed in operation in late September 1959.

During an unusually wet and cold fall period, we consistently averaged 180 tons per hour, using an undersized crane to feed the plant. This winter we have purchased a larger crane to utilize the full capacity of the plant and are confident we can maintain production at a rate well over 200 tons per hour.

We feel the Standard plant is the best built asphalt plant we have ever purchased and are well pleased with it in every respect.

Very truly yours,

Sam Finley, Inc.

RTS/w By Robert T. Smith
Robert T. Smith, Vice-President

SAM FINLEY, INC. says:

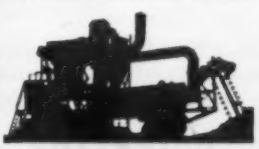
"BEST ASPHALT PLANT WE HAVE EVER PURCHASED"

This revolutionary new STANDARD Model S-E 5000 pound self-erecting, self-contained fully portable Asphalt Plant can be wheeled to the job-site, completely set up *without the use of a crane*, and producing hot mix within 48 hours! Manufactured in 4000, 5000, and 6000 pound batch capacities.

PUSH BUTTON ERECTION — Entire mixing unit is *automatically* raised into operating position.

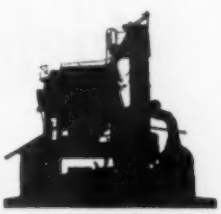
STANDARD
ASPHALT PLANTS

STANDARD / Complete line of Asphalt Plants 2000 through 8000 pound capacity.



Model T-M • Trailer-mounted, self-contained.

Model R-M • Semi-portable and stationary



Model S-E • Self-erecting, fully portable.

STANDARD STEEL CORPORATION *Manufacturers of: Asphalt Plants • Rotary Dryers • Kilns • Coolers • Cryogenics*

GEN. OFFICES AND PLANT: 5003 BOYLE AVE., LOS ANGELES 58, CALIF. • MIDWEST OFFICES AND PLANT: DECATUR 3, ILL. • EASTERN OFFICES AND PLANT: LOWELL 3, MASS.

. . . for more details circle 338 on enclosed return postal card

Wheeling

CORRUGATED METAL CULVERT PIPE BY WHEELING

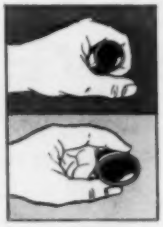
Problem: *Right-of-way must pass stream at 45° angle, instead of normal 90°. Situation further complicated because stream flows downhill at 8 mph.*

Outlasts the highway!

Tax dollars go further when you specify Wheeling Corrugated Metal Culvert Pipe for highway drainage. That's because Wheeling Culvert Pipe costs *less* to buy . . . *less* to install . . . and *less* to maintain! Here's why:

Can't disjoint—Wheeling Culvert Pipe comes in long lengths, so joints are few. What's more, they can't open because pipe has beam strength . . . and Wheeling Culvert Connecting Bands grip *both* pipe ends securely.

Flexible strength — Unlike rigid pipe, corrugated metal culvert pipe is flexible. So it easily absorbs shock and

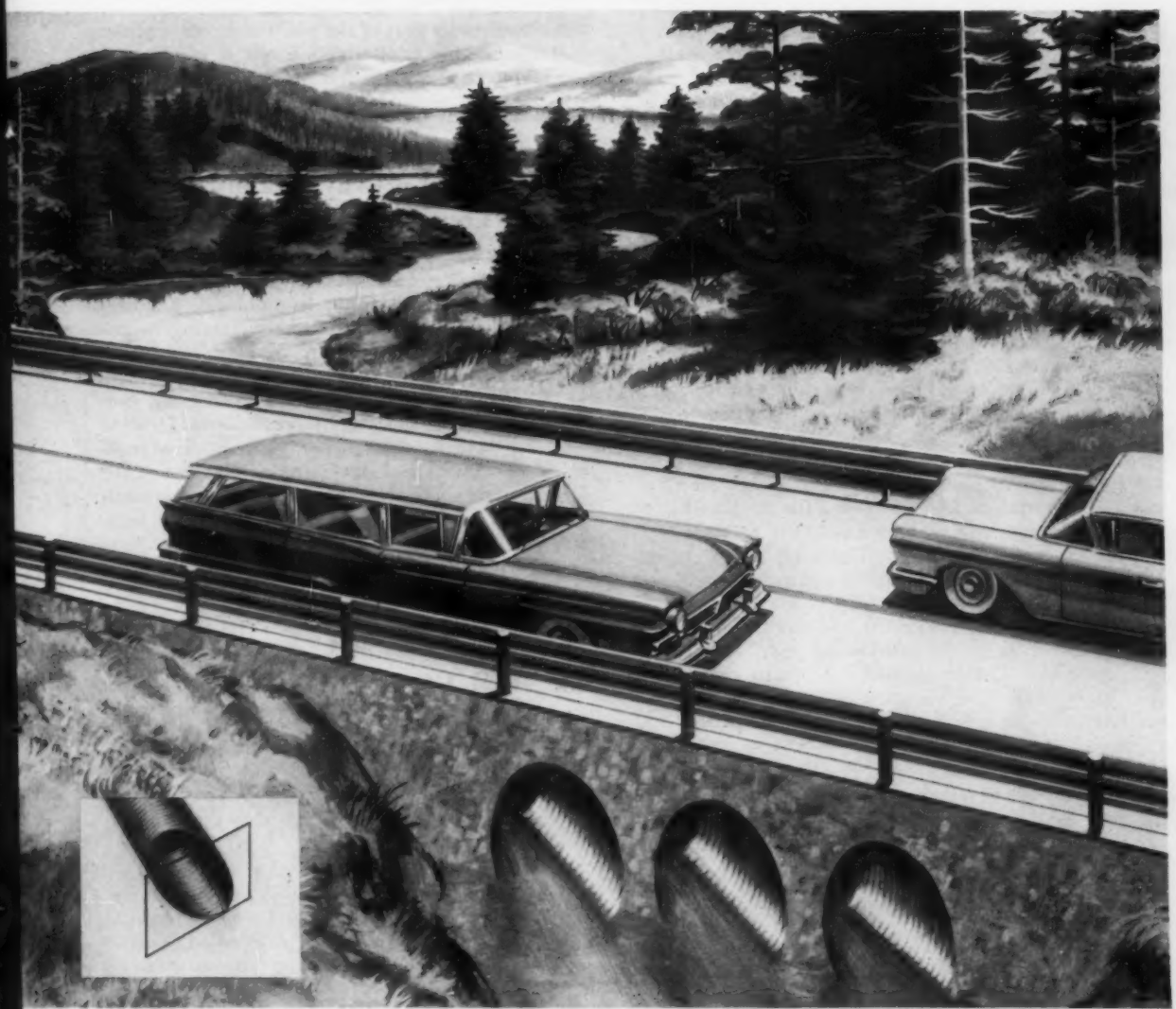


extreme vibration caused by shifting fill and heavy trucks. Equally important, this flexibility enables Wheeling Culvert Pipe to "borrow" strength from surrounding fill (see for yourself — try this simple test with your garden hose).

Choice of end treatments—Special end treatments (including skews and bevels) can be quickly, economically supplied by your Wheeling Culvert Plant.

WHEELING CORRUGATING COMPANY

Warehouses: *Boston, Buffalo, Chicago, Columbus, Detroit, Kansas City, Louisville, Minneapolis,*



Solution: *Wheeling Metal Culvert Pipe with skewed and beveled ends. This allows the pipe structure to be designed with the stream flow . . . permits the ends of the pipe to conform to the contour of the slope, thus improving efficiency and appearance.*

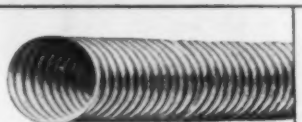
Get the full story on Wheeling Corrugated Metal Culvert Pipe and Fittings (both copper steel and copper-bearing pure iron) from your Wheeling man. Wheeling Corrugating Company, Wheeling, W. Va.

You always get fast delivery on Wheeling Culvert Pipe and Fittings because Wheeling maintains special culvert plants at Des Moines, Detroit, Kansas City, Louisville, Madison, Wis., Martins Ferry, Ohio, Minneapolis, Peoria, Philadelphia, St. Louis.

USE WHEELING CULVERT PIPE HERE, TOO!

Where headroom is limited, use special wide-based Wheeling Pipe Arch.

For efficient roadside drainage, use Wheeling Small Diameter Culvert Pipe.



For deep, fast-flowing streams, use Wheeling Large Diameter Culvert Pipe.

For deep, shifting fill, use Wheeling Large or Small Diameter Culvert Pipe.

IT'S WHEELING STEEL!

New Orleans, New York, Philadelphia, Richmond, St. Louis. Sales Offices: *Atlanta, Houston.*

. . . for more details circle 348 on enclosed return postal card

Concrete Additive Slows Reinforcement Corrosion

Highway contractors and engineers who have sought more durable concrete bridge decks are concerned, among other things, with the possible action of salt on reinforcing steel. Salt which accelerates corrosion may come from de-icing applications.

For this reason there is interest from this quarter in the use of an additive in concrete for reinforced concrete piling, placed for a wharf of Richmand Refinery, in California. Hydropel, an American Bitumuls product, was used in the 7.5-sack concrete mix for this completed in 1946, the contractor being Ben C. Gerwick Co., at San Francisco. One and one-half gal. of Hydropel was used per sack of cement.

A long-term study was initiated at that time to determine the effectiveness of this additive as compared to plain concrete under sea water exposure. The test involved 210 specimens using the same mix and materials as were employed for the wharf. Some test specimens included steel rods to simulate reinforcement conditions. The study has been carried out by the Standard Oil Company Materials Laboratory (Richmond).

The report to date is that the additive definitely reduces corrosion of the reinforcing rods, as evidenced by this 12-year exposure. Strength curves have been good. The modulus of rupture of the concrete containing the additive, after this period is almost twice that of the plain concrete specimens (probably due to elimination of fine cracking that occurred in the plain test beams).

Right-of-Way Training Course Given in Iowa

Right-of-way personnel in the Iowa State Highway Commission have recently undergone a training program. E. V. John, Right-of-way Engineer for the commission, directed this training, which was aimed at tightening up on land acquisition proceedures including appraisal and negotiation.

The course included elementary engineering (surveying in particular); highway planning; location and design; highway financing; a discussion of highway fund sources and expenditures in Iowa and the accounting system; appraisal for highway purposes; title search and examination; legal aspects of highway right-of-way acquisition; highway property management.

New HRB Committee to Tell Public

A new committee to better acquaint the public with important findings in highway research has been established by the Highway Research Board, National Academy of Sciences-National Research Council, Washington, D.C.

Pyke Johnson, HRB's chairman, has announced that John W. Gibbons, director of public relations for the Automotive Safety Foundation, will serve as chairman of the newly formed Committee on Public Dissemination of Research Findings. The new committee's chief duty will be to provide public information media with major results of the research reports presented to the Board in all phases of highway transportation, through a planned editorial program.

The Highway Research Board under its existing program will issue nearly 100 publications in 1960. In announcing this added HRB activity, Mr. Johnson said:

"Dedicated men in highway research are advancing the frontiers of knowledge. In economics of highway transportation, in development of new equipment and materials for highway construction, in design of urban expressways with high capacity, in safety, in traffic control—and in many, many other areas—they are producing information this country needs in order to build better, safer highways. The responsibility of the Board is to provide a platform where those findings can be brought out of the laboratory and reported.

"The desire of the press, we know, is to take such findings another step—that is, to interpret their significance to the particular readership they represent. We hope that the new Committee on Public Dissemination of Research Findings can be helpful to them in this respect."

NOTHING COMPACTS ASPHALT LIKE HEAT DOES . . . NOT WEIGHT, NOT VIBRATION
For Paving or Patching
HOT WITCH
HEATED ROLLER . . .
ROLLS HEAT INTO ASPHALT
AND BONDS IT . . .
LOW COST
L-P GAS
FIRED
ROLLER
• Use hot or cold mix
• For paving asphalt medians, patios, etc.
• Patch streets and driveways
• 18" Roller width
• Handle extends to 10'
• ½" Side clearance
• 225# Wt., incl. fuel
• Compaction = 5 T. dead wt.
CHARLES Machine Works, Inc.
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!!HERE!!
THE GREATEST SHOW ON WOR
'61 CHEVROLET STURDI-BILT TRUCKS
JUST OUT!!JUST THE WAY YOU W
CHEVROLET
THIS
TO THE

PROVED WORTH MORE BECAUSE THEY WORK MORE

1961 Chevrolet trucks roll in on a wave of owner acclaim!

Sure enough, a gigantic advance in truck design has shortened every route in America. It began just a year ago, when the first Torsion-Spring Chevy nosed out onto a highway. With a vastly different truck design, featuring torsion-bar independent front suspension, this totally new Chevy was a big winner right from the start. Thanks to its amazing bump-cushioning ability, it did just about everything better. Got more work done in a day, for instance, with a floating ride that all but assured faster schedules on any roads. Slashed maintenance with a jolt-free ride that drastically reduced wear on truck components. Owner's earning power began to soar and word got around. This one caught on fast. So fast, in fact, that there are now, already, *nearly 300,000* Torsion-Spring Chevies putting out this new kind of working ability on tough jobs all over America. It's been a giant step forward in trucking and it's only the beginning. *Because, here for 1961, are Chevrolet trucks with even more of the worth-more, work-more performance that's won such wide owner acclaim over the past year.* Even more strength, even more stamina—and an even wider range of models. Look 'em over here—see how a Torsion-Spring Chevy can smooth out that rough hauling job of yours . . .

1961 Chevrolet light-du

MORE MODELS! ★ MORE WAYS TO

New worth-more p panels, Suburban C Step-Vans, forward and chassis-cabs ★ proved Torsion-Sprin ★ 3 new go-anywhere drive models ★ Fam saving Thriftmast Tough, short-stroke master V8 ★ Roomy Comfort-King c Spacious bodies th more cargo ★ Bi Torque-Action br Brawny box-section big-capacity axles!

*All series except K10, P30.

1961 Chevrolet heavy-duty trucks

MORE MIGHT! ★★★★★★ MORE EARNING POWER!

51 mountain-moving heavy-weights ★ Choice of Conventional, tilt or Low Cab Forward models ★ Tough Torsion-Spring Ride ★ Best-built big-tonnage V8's going ★ G.V.W.'s up to 36,000 lbs., G.C.W.'s up to 51,000 lbs. ★ Massive K- and X-braced frames ★ Advanced Eaton-Hendrickson tandem units ★ Rugged rear axles up to 18,500 lbs. in capacity ★ High-capacity variable-rate rear springs!

uty trucks
★★★★
SAVE!
pickups,
Carryalls,
controls
★ Work-
ng Ride*
e 4-wheel
nous gas-
ter 6 ★
e Trade-
y, rugged
cabs ★
hat carry
ig, safe
rakes ★
frames,
K20, P20,

1961 Chevrolet medium-duty trucks

MORE WORTH!★★★★★
MORE WORKING ABILITY!

88 big-saving models to choose from ★ Owner-acclaimed Torsion-Spring Ride ★ Big Comfort-King cabs ★ Sure-saving Jobmaster 6 power ★ Durable Taskmaster V8 power ★ Easy-wheeling Low-Cab-Forward models ★ Big-payload Chevrolet tilt cab trucks ★ Work-saving Powermatic transmission ★ Sturdy-built frames and axles!

MORE MIGHT! MORE MODELS! MORE WAYS TO SAVE! NEW CHEVROLET TRUCKS FOR '61!

They're worth more than ever before because they'll *work* more than ever before! Here's Chevy for '61 with a longer line of models, extra strength and stamina . . . even more of the smooth, tough performance that's won high praise from truckers all over America!

PICK FROM 189 MODELS! More models than ever before—work-proved dollar savers in every weight class! 1961 Chevies for every hauling chore in the book include three new long-wheelbase 4-wheel-drive models, sturdy Stepside and Fleetside pickups, spacious panels, versatile Suburban Carryalls, handy Step-Vans and forward controls, tough chassis-cabs of all sizes, mountain-moving tandems. Somewhere in this long, *long* line you're sure to find the one truck that makes the most sense on your job!

OWNER-PROVED TORSION-SPRING RIDE! It puts an end to I-beam axle shimmy! Independently suspended front wheels step right over bumps, tough torsion bar springs soak up jolts. New smoothness improves virtually every phase of performance; speeds up schedules, cuts truck wear and maintenance expense, reduces cargo damage and driver fatigue! Owners report that there's never been anything like it for high-profit hauling—and it's *standard* on every 1961 Chevrolet model, except Forward Controls and 4-wheel drives!

STRONG, ROOMY CABS THAT HELP BOOST YOUR WORK OUTPUT! Rangy drivers ride in comfort with stretch-out room in all directions. Extra hip room, shoulder room, leg room and head room. Seeing is safe and easy through a whopping-big wraparound windshield. The seat's a beauty, too—a full 59½" wide with a spring combination inside that gives just the right support. (And for the last word in working comfort, special 6" foam rubber padding is optional at extra cost.) And these cabs are *rugged*, with a build that includes all-steel construction, double-panel roof, double-walled cowl housing and box-section door pillars.

TOUGH TRUCK CHASSIS—BRAWNY BASIS FOR BIGGER PROFITS. The best sellers have never been huskier, starting with the massive, truck-built frames that add stamina to every chassis. In medium- and heavy-duty models, rugged self-adjusting variable-rate rear springs help smooth out big-tonnage hauls. Quality features galore boost truck life in every Chevrolet truck for '61. Extra-big brakes give faster, surer stops and last longer. Precision wheel balance makes steering easier, lengthens tire life. Smooth, durable Synchro-Mesh transmissions come in sizes to suit all types of duty.

ENGINES WITH PROVED EARNING POWER. Famous sixes that out-sell all others because they're best at brightening cost records . . . big V8's that lead the industry for short-stroke design and hard-working durability! Chevy for '61 offers a *long* line of power plants to meet the special needs of every weight class. They're money-making specialists, designed to hammer down high costs in tough truck duty.

The truth is, we could fill every page in this magazine with reasons why Chevrolet trucks have never been better than they are for '61, but there's no need for that. Not when your Chevrolet dealer can boil it all down for you so quickly and pleasantly. See him soon and start saving soon! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Member of the ATA Foundation, Inc., American Trucking Industry

1961 CHEVROLET STURDI-BILT TRUCKS CHEVROLET

. . . for more details circle 306 on enclosed return postal card

AED's 1960 Rental Rates

Current monthly, weekly, and daily rental rates for over 1500 items of construction equipment are set forth in the Associated Equipment Distributors' forthcoming 1960 Compilation of Rental Rates. The new 84-page compilation is the 12th edition of this popular reference to be published by AED, national trade association of the construction equipment industry.

Based on a nation-wide survey conducted this past summer among over 800 AED distributor members, the 1960 Rental Comp ("Green Book") reflects average rates as reported by these dealers. However, the Association points out that these are not actual rates for any one part of the country, but are national averages printed solely for informational purposes.

Expanding on this latter statement, AED's Rental Committee, chairman, E. E. Dionne of A. H. Cox & Co., Seattle, Wash., has stated that rental rates vary greatly throughout the United States, depending on local practices and conditions. Also, the use to which equipment is placed can be another important rate factor. Thus, the committee says, individual rental rates can only be set by each distributor.

Others serving on AED's Rental Committee are: Sam Baar, Neil B. McGinnis Equip. Co., Phoenix, Ariz.; Ben B. Brown, Herman M. Brown Co., Des Moines, Iowa; N. O. Jones, Northwestern Equip., Inc., Fargo, N. D.; Paul K. Smith, Anderson Equip. Co., Bridgeville, Pa.; and W. W. Williams, Jr., The W. W. Williams Co., Columbus, O.

Scaffolding Institute

The Steel Scaffolding and Shoring Institute, a national non-profit organization with headquarters in Cleveland, has been formed by a group of leading manufacturers of these products. Dr. John B. Scalzi, Associate Professor of Engineering, Case Institute of Technology, is appointed managing director.

The Institute's objectives are to "promote, establish recommended criteria and inspection procedures for, and collect and disseminate information concerning, steel scaffolding and shoring, in the interest of the general public welfare and safety and the steel scaffolding and shoring industry."

The Institute's early agenda includes development of engineering criteria and standard testing procedures. Through dissemination of information to the construction industry pertaining to proper and safe use of steel scaffolding and shoring, the Institute's members aim to improve their service to their contractor customers.

Regular membership in the Institute is open to U. S. companies which make steel scaffolding or shoring. Associate membership is available to independent distributors of these products, steel and other suppliers to the industry, and other parties interested in the objectives of the Institute. Application for either type of membership should be addressed to Dr. John B. Scalzi at 2222 Mt. Verznon Blvd., East Cleveland 21, Ohio.

Negative thinking can cost you 50% more
Don't Scrap Giant Tires When Retreads Do the job at half the Cost
Giant size savings plus new tire mileage are yours when you specify Southern Tire's expert retreading service.
No need to worry over costly downtime, either. Southern Tire trucks pick up your tires after hours and return them quickly to service.
A wide selection of treads include Rock Service • Traction Types • Rib Treads.
All sizes from 1100 x 24 to 33.5 x 33.
TAKE THE POSITIVE APPROACH, CALL COLLECT:
SOUTHERN TIRE COMPANY
1414 Broadway SHEFFIELD, ALA.
Phone Collect EV 3-2312
TRE
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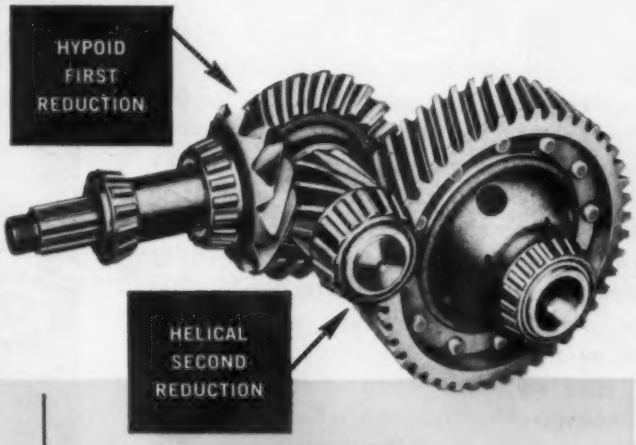
Heavy-Duty Hauling Jobs Are Easy With Timken-Detroit®

BALANCED

HYPOID-HELICAL DOUBLE-REDUCTION AXLES

Timken-Detroit balanced hypoid-helical double-reduction gearing is unequalled for top performance and dependability. Outstanding advantages that make it the choice of heavy-duty equipment manufacturers and operators are: big, husky gears . . . greater flexibility in gear ratios . . . balanced gear set loadings . . . long life and low maintenance costs. The hypoid first reduction is 30% stronger than spiral bevel, and works in series with the second reduction to take an equal share of the load. In the helical second reduction, strong helical gears with a wide range of ratios insure balanced double-reduction gearing.

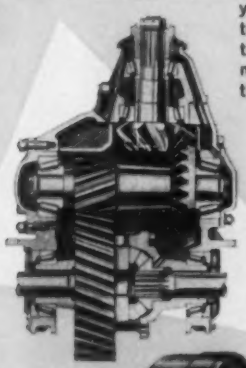


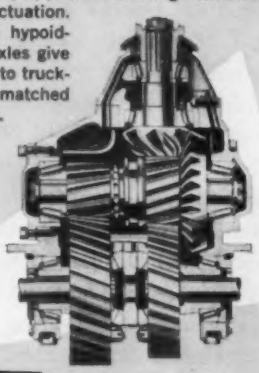
240 SERIES
SINGLE-SPEED, HYPOID-HELICAL DOUBLE-REDUCTION

Two full-sized gear sets form a balanced power train—with each gear set accomplishing a substantial reduction. This combination of husky hypoid first reduction gears coupled with rugged, wide-faced helical second reduction gears provides a double-reduction gear set that outperforms all others. Because the ratios of each reduction may be varied, you get a balanced power train with the larger selection of axle ratios for maximum operational versatility and performance.

340 SERIES
TWO-SPEED, HYPOID-HELICAL DOUBLE-REDUCTION

A true two-speed axle which provides two separate gear ratios through the use of two full-size helical gear sets . . . a "fast" ratio for maximum speeds and a "slow" ratio for greatest pulling power. Pick the most efficient gear ratio to meet your requirements of speed, load and road. Spring-flex power shifting provides simple, positive shifting with either air, vacuum or electric actuation. Timken-Detroit two-speed hypoid-helical double-reduction axles give a versatility and economy to trucking operations that is unmatched by other axle gear designs.





choice of two—

INTERCHANGEABLE BALANCED DOUBLE-REDUCTION DRIVES

Another Product of...

ROCKWELL-STANDARD CORPORATION

ROCKWELL R STANDARD

Transmission and Axle Division, Detroit 32, Michigan

. . . for more details circle 334 on enclosed return postal card

How to put a culvert to bed

(and keep it there)

One of the best things about installing Corrugated Steel Drainage Structures is the fact that an elaborate foundation is not needed. If you're laying Corrugated Culverts for roadway drainage, usually all you have to do is to smooth the grade line and straighten the channel alignment. Forget about forms and curing time; Corrugated Steel Culverts can be rolled or lowered quickly into place, back-filled, and forgotten.

Here are a few things to remember: the load-supporting capacity of a Corrugated Steel Structure depends on its foundation and the manner in which it is bedded. The foundation should be free of projecting stones, roots and debris. Corrugated Steel Culverts need not be encased because this would hinder one of Corrugated Steel's big advantages—flexibility. Back-fill should be kept clean, too, and well tamped until it reaches a minimum of ¾ of the height of the pipe. Tamping above this height is not necessary.

Quick, economical installation is just one advantage of Corrugated Steel Drainage Structures. They cost less, are free from upkeep and repair, and they're built to *last*.

Send for U. S. Steel's free booklet on Culvert Sheets for Metal Drainage Products. It tells all about design, sizes and weights, installation and other valuable engineering details. Write today, to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

USS

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

This mark tells you a product is made of modern, dependable Steel.

The Reuben H. Donnelley Corporation Acquires Gillette Publishing Co.

The Reuben H. Donnelley Corporation, a publisher of magazines since 1931, has acquired the Gillette Publishing Company, and with it this magazine, Roads and Streets.

As announced by Curtiss E. Frank, Donnelley president, the Gillette organization under the new ownership will continue with its present staff in the publishing of highway, heavy construction and maintenance magazines. These include in addition to Roads and Streets, the magazines Street Engineering, Rural Roads, Caminos y Construccion Pesada (Latin America, Spain and Portugal) and World Construction (Eastern Hemisphere).

This acquisition marks the continued rapid growth of The Reuben H. Donnelley Corporation's magazine publishing division, which within the past year has increased more than 100 percent, with the number of its publications now totaling 23.

1960-1961 marks the 75th year of The Reuben H. Donnelley Corporation in the publishing of classified telephone directories in Chicago.

New Communications Net for Parkway

The Garden State Parkway has contracted with General Electric Company to supply an integrated mobile radio and microwave network, this new facility, the most modern in the nation, will provide for future incorporation of data transmission channels to handle toll road paper work, and for remote control channels which could be used for traffic signs.

Basic backbone of the network will be a 120-channel microwave relay system operating in the 6,000 megacycle range. This will tie together state police and parkway maintenance crews traveling along this toll road, which runs the length of New Jersey.

Under the contract, G-E will supply 131 mobile radio units for use by patrol cars and highway vehicles. The agreement also calls for 21 table-model very high frequency G-E base stations and 17 G-E microwave stations to be located at various points along the 173 mile route.

Designed by Ebasco Services Inc., engineering consultants, the microwave-mobile network will have channels for telephone and teletype circuits and for parkway vehicles. All will be linked to a switchboard at the central headquarters in Woodbridge, where the Parkway Commission is relocating its headquarters.

West Virginia Department Receives Award

The West Virginia State Road Commission has been presented with a plaque for its easy-to-read highway program report. The award was made by Arthur C. Butler of the National Highway Users Conference to the Commissioner, Patrick C. Graney. U. S. Senator, Jennings Randolph from West Virginia was a special guest at the ceremony.

Roadside Maintenance

Chemical Mixtures Aid Safe Winter Driving

The 1959-1960 winter added to the experience with blending salt and calcium chloride for de-icing of pavements. Following research there now seems to be a trend toward blending the chemicals, particularly for roadways where ice or packed snow has made driving hazardous.

Much of the experimental work with chemical mixtures, notes the Calcium Chloride Institute, was done on the Ohio Turnpike within the past three years. The turnpike's directives now include the use of a mixture to melt snow or ice whenever temperatures fall below 32 F.

Despite extremely cold weather, the chemical mixture melts ice or hardpacked snow quickly. In Wisconsin, for example, the mixture has been successful in clearing a highway in a matter of 30 minutes after application. In New York, maintenance officials report a cleared roadway in 15 minutes after one winter storm. The recommended ratio is three parts salt to one of calcium chloride. Often the chemicals are mixed before the winter season and stored under tarpaulins or similar cover until ready for use.

A free copy of "Calcium Chloride and Salt Mixtures," is available from Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

ROADSIDE MAINTENANCE cost looms as a major cost item for Interstate freeways and other express highways including toll roads.

There may also be some state laws involved. Hal Foust, the Chicago Tribune's shrewd automobile editor, ran a feature story in August on the weed crop along the Illinois Tollway. The pollen season inspired this timely writing, which spotlighted a state law seemingly being violated.

Chapter 121 of the Illinois revised statutes was quoted as follows:

"Highway authorities shall annually, at the proper season, to prevent the spread of the same, destroy or cause to be destroyed, all cockleburs, Canada thistles, Russian thistles, burdock, mustard, yellow dock, Indian mallow, jimpson weeds, or other noxious weeds, brush or plants growing upon all public highways under their respective jurisdictions.

"The highway authorities shall seasonably mow and keep down all weeds or other vegetation growing along the highways under their respective jurisdictions.

"Any highway officer failing to comply with the provisions of this section shall be liable to a fine of not less than $10 nor more than $25 for each season in which he neglects such requirements."

Foust went on to report that the Tollway had been well grassed and mowed along its median strip, but that weeds were rampant along most of the embankments and cuts in all seven counties traversed.

Now New York specifies basic lead silico chromate in all coats of rust-inhibitive paint system

You can be *sure* that before any state changes a basic materials specification, evidence must be substantiated indicating superior performance.

Adoption by the New York State Department of Public Works of a rust-inhibitive paint system containing basic lead silico chromate pigment in all coats, is a case in point. The initial evidence for this decision was established by more than ten years of exposure testing by National Lead at its Sayville, Long Island, Test Station.

It was found that even without a finish coat to protect them, primers containing *M50*® basic lead silico chromate pigment endured ten years. And the *M50* pigment, unlike other rust-inhibitors, could be used in intermediate and finish coats as well as in primers.

Then the state obtained its own evidence by painting several bridges with basic lead silico chromate paints. One such job was the renovation of the Albany, New York, bridge shown above. It called for both shop-coat priming of new steel and spot priming of the old. And the intermediate and finish coats were properly applied in the Fall.

Pass field test with flying colors

New York State Engineers were more than satisfied . . . not only with the performance but also with the working properties, tint retention, and color uniformity of the basic lead silico chromate paints. On November 28, 1958, the Division of Construction of the New York State Department of Public Works issued new "Paint and Painting" specifications calling for basic lead silico chromate pigment *in all coats* of the typical rust-inhibitive paint system for highway structures. Today, state after state is following suit.

For information on basic lead silico chromate paints, consult your regular paint suppliers. For technical details on National Lead's basic lead silico chromate, *M50* pigment, contact National Lead Company.

M50® an **oncor**® *Pigment... A Development of* **National Lead Company**

General Offices: 111 Broadway, New York 6, N.Y.

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Portable Lima Austin-Western 101-SE crushing plant spews pit-run stone and gravel into mobile surge bin.

Lima A-W Portable Crushers deliver

RELIABLE HIGH OUTPUT!

Designed and built for high output under *rugged* operating conditions, this portable Lima Austin-Western crushing plant is *ready* to pick up and go on a moment's notice. It belongs to the Williams Brothers Asphalt Paving Company, Ionia, Mich.

Reduced tonnage costs

They say, "It's a reliable high-output mobile rig that's been doing a very dependable job for us in widely separated locations throughout southern Michigan.

"It's not a complicated piece of equipment. Only minimum maintenance has been required. It's easy to adjust to meet a wide range of rigid specifications in pit or quarry work. We find that the outfit's one man, central control also helps us to reduce costs per ton."

The 101-SE is a completely portable, self-contained unit designed and built for rapid transport from job to job. High-speed production of construction materials near the job greatly reduces hauling time and costs.

Maintenance reduced

Diesel power operates crushers and electric generator; all other operations are electric. Simplicity of transmission eliminates troublesome clutches, chains, sprockets and gearboxes . . . reduces maintenance, increases tonnage profits.

There's a portable or stationary Lima Austin-Western crushing and screening plant just right for your needs. Investigate—see your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Stationary Installation—Lima A-W line includes jaw and roll crushers, matching screens, elevators, conveyors and bins.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

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CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

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American Pipe and Construction Co., operating throughout the West from headquarters near Los Angeles, offers a wide range of reinforced concrete pipe for virtually every water supply, sewerage and drainage pipeline requirement. The company chose Fuller 5-C-720 Transmissions for heavy hauling because of their work-matched gear ratios, low gear-tooth pressures, helical gearing in all forward speeds, short length and light weight.

Geared by Fuller . . .

More profit from JOB-SPECIFIED Transmissions

Whatever you're moving — concrete pipe or cotton, radishes or rock — there's a Fuller Transmission to help you do the job faster, easier and more profitably. Fuller offers:

- 88 models of heavy-duty transmissions for trucks, construction equipment and industrial use.
- Capacities matching gasoline, diesel and LPG engines . . . from 330 to 1550 cubic inches . . . up to 600 hp.
- Models available with manual and semi-automatic shifting, or with the new, all-air-actuated Fullair Control.

Your job writes the specifications for the Fuller Transmission engineered to boost *your* profits. Get full details from your dealer.

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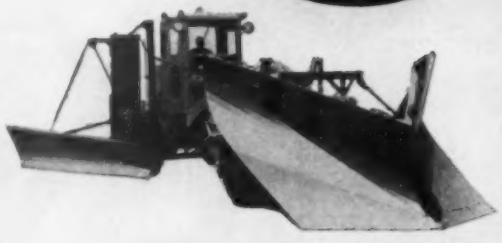
For Year-Around Efficiency Graders Do DOUBLE-DUTY with

FRINK SNO-PLOWS
REG. U. S. PAT. OFF.



Now, **another** cost-saving FRINK Sno-Plow combination! Uniting earth-moving with snow-removing, a grader equipped with a FRINK Sno-Plow gives year-around utility. A simple installation readies many graders for efficient winter snow-fighting.

The heavy-duty V-Type Sno-Plow with eight- or nine-foot cutting edge is attached in the same way as on trucks, with complete full-power hydraulic control. The driver has at his fingertips the standard FRINK quality of rugged, dependable operation.

For full details on making year-around cost-saving use of your graders with extra-duty FRINK Sno-Plows, write: Dept. RS-106

- V-Type
- Roll-Over
- One-Way
- Reversible Trip
- Leveling Wings

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FRINK Sno-Plows, Inc.
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Eastern Steel Products, Co.
Preston, Ontario, Canada

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Helicopter? No – Look Again

The world's largest truck crane lifts "little brother" 100 ft. off the ground at a recent demonstration by Harnischfeger Corp. The big P&H crane's 200 ft. boom plus 50-ft. extension lifts up to 80 tons with no strain. The smaller crane is the P&H "Miti-Mite," weighing 31,000 lb. Both machines were bought by John N. Brocklesby Transport Ltd., of Montreal.

Central American Road Bottleneck to End

Work has begun on a bridge contract in Costa Rica which will remove the last gap in the Inter-American Highway between the United States to Panama City.

The contract, which was let by Costa Rica with U.S. Bureau of Public Roads concurrence, covers 39 bridges of reinforced concrete and structural steel in a now unusable stretch of 133 miles between San Isidro del General, Costa Rica, and the Panama border.

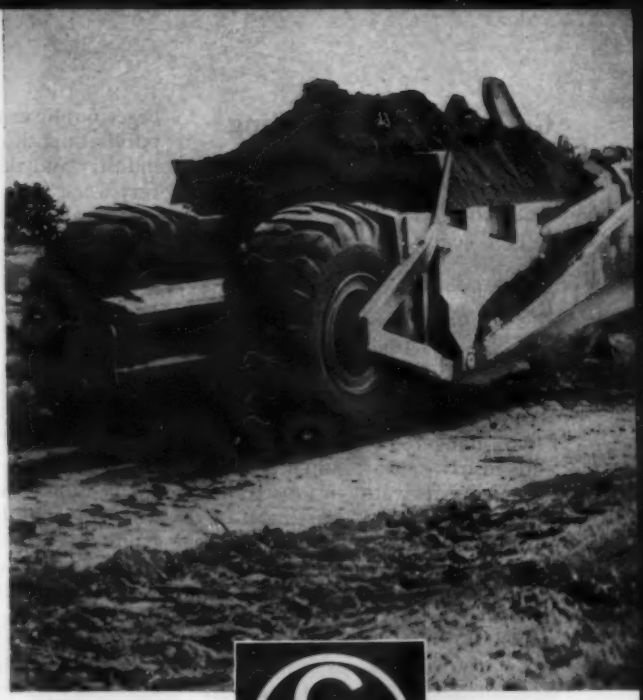
Since 1930, the United States has been assisting the six Central American republics in building the highway, for the most part on the basis of two-thirds U.S. funds and one-third cooperating republic funds. The bridge contract is for $4,770,000 (U.S. share $3,180,000), with completion in March, 1962.

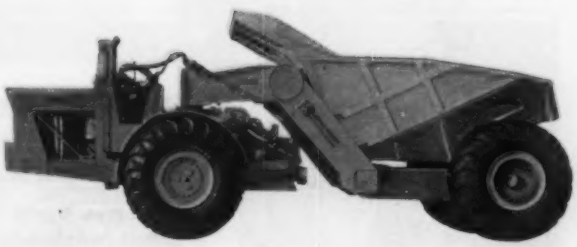
YARDS AHEAD

PRODUCTION

...Your Big 'Extra' With The Curtiss-Wright Line

Those extra yards you pack into each pass . . . the extra cycles per day . . . the extra profit you make from Curtiss-Wright's high output and low operating cost—This is what we mean by the "Yards Ahead" production of the Curtiss-Wright line. Throughout the country, from these scrapers shown working on a road job in the deep south, to the fleets of C-Ws handling tough excavation in the mountains of California, Curtiss-Wright scrapers are giving contractors *production unmatched by any other scraper.* You'll find this "Yards Ahead" production in every C-W model, from the 8 cu. yd. CW-28 to the tremendous CW-226. Check with your distributor on the model to meet your job requirements.





MODEL CWD-221

INTERCHANGEABLE REAR DUMPER

. . . one of the three rear dumpers in the Curtiss-Wright line. Interchangeable with two or three axle scrapers, C-W rear dumpers are available in capacities to 35 tons.

SOUTH BEND DIVISION

CURTISS-WRIGHT CORPORATION

SOUTH BEND, INDIANA

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Good Job Housekeeping

(From a Bulletin to member contractors, Virginia Road Builders Association)

Too many highway contractors allow bad housekeeping practices on their jobs. These contractors "hog" through the job with their grading operations, tearing up everything and finishing nothing. They strip the "gravy" and leave the meat, unsightly, costly, and often dangerous. Thoughtlessly and nearly always unnecessarily, they leave private entrances and intersecting roads in an almost impassable condition. They often park equipment and store materials to the detriment and discomfort of the travelling public and the property owner.

They treat the paying public with such shocking bad manners that they are no credit to themselves or to the construction industry they represent.

At a time when the highway construction industry so desperately needs public understanding and public support, such bad housekeeping and bad manners will only beget public misunderstanding and public opposition. It will get the industry and the road program the very worst kind of public relations.

It is also bad for your business relations. No engineer likes to see a job messed up from end to end, with no finished work, and when he makes an inspection of this kind of job he gets the impression that the contractor is in the habit of doing sloppy work. This sure ain't no way to make friends and influence people.

If you dress your work up as you go along, you will find that you will get compliments instead of grumblings from the owners and that the travelling public and property owners will be your allies instead of your opponents. You will also find that you will save money when you finish as you go. It always costs money to move back in to complete a half finished job.

You may think that you are saving money and doing a fast job when you perform slovenly work, but when you go back to do it over and dress it up, you're sure to discover that it was costly and only half fast.

It is in your own self interest to have good manners and good housekeeping on your job. It surely doesn't make sense for a contractor to proudly post his name on the job, and then store and stock his equipment and materials in such a sloppy manner that it looks like an unkempt junk yard; or to hog through the job and tear everything up so it looks like a runaway rocket had made an unscheduled landing on the right-of-way.

We started out by saying, "Too many contractors". If there is *one* contractor that has such bad manners and practices bad housekeeping—he is too many.

Bad highway housekeeping is not good for the industry. Bad manners are never good business.

A TOTAL OF 1,586 contracting firms failed during the first seven months of 1960, according to Dun & Bradstreet. This is the highest number for a like period since this reporting service began keeping records in 1934. Highway contractors were in the minority despite the recent setback in the federal road program.

GARRISON power steering
gives agility to LORAIN'S rugged
4-AXLE MOTO-CRANE!
Garrison Power Steering is standard equipment on this big, four-axle 8-wheel (8x4) Lorain Moto-Crane, available in 22½, 25, 30 and 35 ton models.
The tandem front axles supply 4 tires to improve front end weight distribution and thus better the machine flotation and maneuverability for off-the-road and on-the-job travel. The 4 front wheels are steered simultaneously and in the correct geometry for proper tracking... such steering is accomplished with only slight pressure on the steering wheel... thanks to Garrison Power Steering.
With hydraulic power doing 80% of the work of turning, operators tire less easily, do more work in a day's time. Important, too, shock from rubble, rough ground, etc., is absorbed by the hydraulic booster, adding life to the steering mechanism.
Since Garrison Power Steering is available as optional equipment on all Lorain Cranes where it is not standard equipment, why not make sure you get its advantages on your next rig?
LORAIN
GARRISON Manufacturing Co.
POWER STEERING KITS AVAILABLE—Garrison Power Steering is available as optional equipment on most makes and models of trucks, wheeled off-the-road equipment, and tractors, and material handling equipment. Write for complete information
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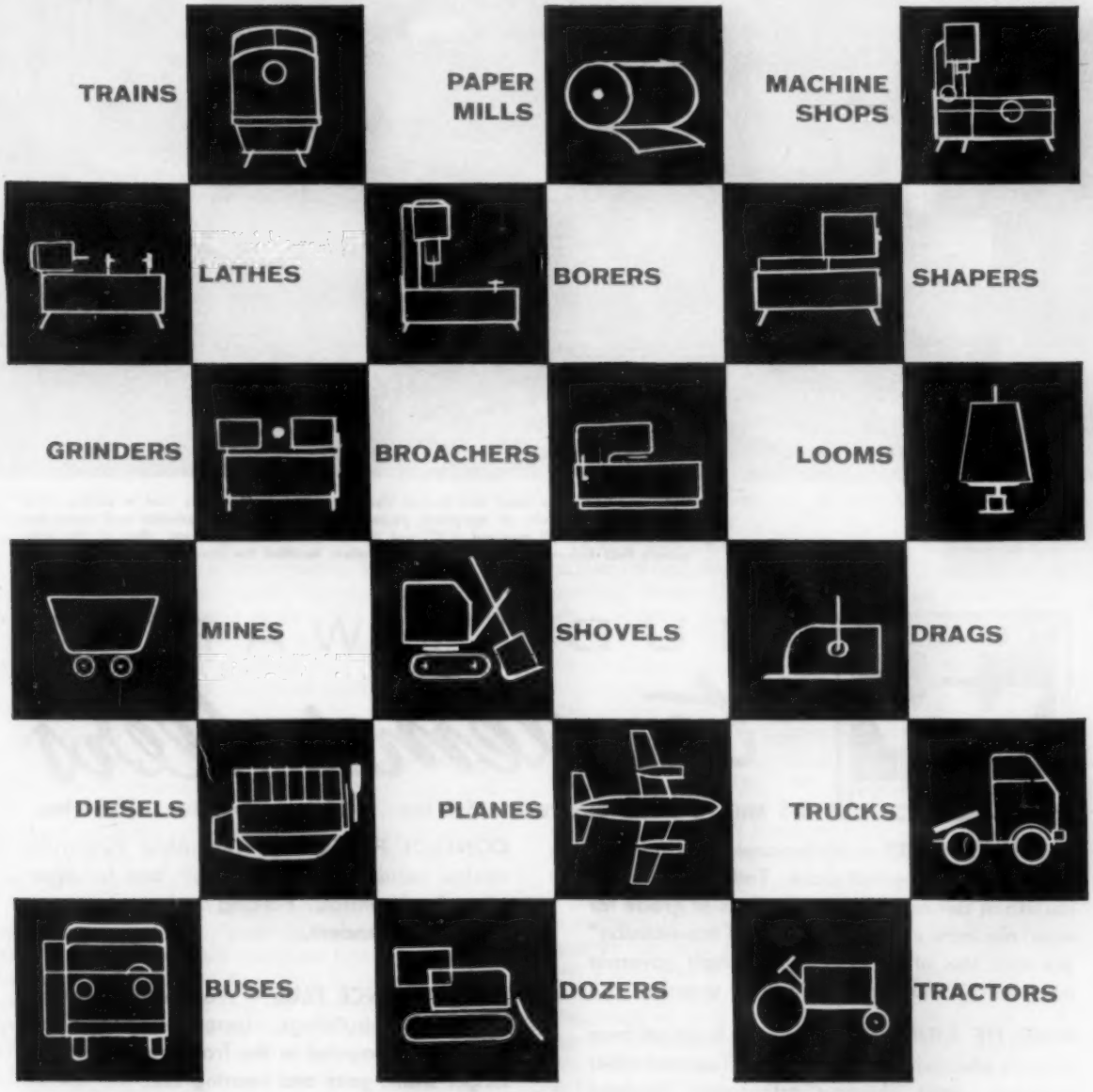
If you manage or operate any of these...



...your best move is to Sinclair's specialized greases, oils and lubricants, to cut costs, speed operations and increase profits. There are more than 500 of these money-savers, and each does its particular job particularly well. For helpful information based on actual experience, call your Sinclair Representative or write

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MARYLAND—Contee Sand and Gravel Company of Laurel recently had a paving crew busy at the University of Maryland, paving streets, information turnouts and sidewalks. The 8-foot sidewalk received a 2" mat of PC-1 bituminous concrete. One of the company's four Huber-Warco 5-8 ton tandem rollers handled the compaction.

HUBER
WARCO

HUBER-WARCO *tandem rollers*

3-5 ton 4-6 ton retractable 5-8 ton 8-10 ton 8-12 ton 10-14 ton

DRIVE FEATURES — Water-cooled torque converter cushions against shock. Tailshaft governor maintains desired speed regardless of grade for easy, accurate control. Two-speed transmission* prevents loss of efficiency in tailshaft governor or hydraulic steering at all rolling speeds.

KING OF KINGPINS—Complete freedom from kingpin and swivel pin looseness. Tapered roller bearings permit "like-new" adjustment. No road scuff in reversing. Kingpin and housing easily removable.

CONTROL FEATURES — Variable hydraulic control adjusts to steering "feel" best for operator. Dual controls. Parking brake system completely independent.

PERFORMANCE PLUS — Work within less than 2 inches of buildings. Unsurpassed visibility. Final drive mounted in the frame, not on it, for longer shaft, gear and bearing life.

*Except for 3-5 ton and 4-6 ton models.

A trusted product name backed by respected distributor names from coast to coast

MOTOR GRADERS

Standard transmission models from 83 to 160 H.P. Torque converter and power shift transmission models from 102 to 195 H.P.

TANDEM ROLLERS

3-5 Ton • 4-6 Ton Retractable • 5-8 Ton • 8-10 Ton • 8-12 Ton • 10-14 Ton

3-WHEEL ROLLERS

10-Ton • 12-Ton • 14-Ton Standard Weight 10-12 Ton • 12-14 Ton Variable Weight

MAINTAINER

M-52 — 45½ H.P. Attachments are Lift-Loader, Broom, Bulldozer, Patch Roller, Scarifier, Snow Plow, Berm Leveler

HUBER-WARCO COMPANY Marion, Ohio, U.S.A.

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'Better Highways' Campaign Ready for Your Help

The road building industry's new campaign to inform the public on highway needs is off the ground. After a slow start, it is at the point where your support as an industry man will really help account for tangible results.

The Better Highways Information Foundation is the first national *industry-wide* organization ever to be set up as a voice in good roads promotion. It is the first non-profit, public service organization with no axe to grind except that of openly furthering the cause of a strong, continuing, balanced highway building program for the nation.

As reviewed in this issue, the Foundation now has an initial working fund, an effective organization, and a program for immediate action already rolling. And —in many states—it has the most important thing of all: local cooperating organizations and local leadership that will do grass-roots work with the Foundation's backing and aid.

The Roads and Streets editors concur with industry leaders who are familiar with the Foundation's setup that *this is it!* This is just about the best development that could possibly have shaped up, to date, as a stepping stone toward arousing the American people to the highway need—and to the importance of their articulate support when Congress meets in 1961.

The $360,000 being sought to finance the BHIF program this year will be money well spent. If enough individuals and organizations pledge support now, the burden on each will be small.

Where to turn? Every state has a team of Foundation representatives collecting contributions. (We have listed one member in each state on page 98.) These are the men to contact.

If your group hasn't come aboard, you can do a good turn by urging that it do so—national and local industry associations in a growing list are already helping to make the Foundation the broadly representative voice required to do its job. Any industry group, local or national, that has any stake at all in the highway program, yet doesn't help out now, is short sighted indeed.

Of course there is no doubt as to the urgency of the public information effort which the Foundation is tackling. When Congress convenes next January, the whole highway program will be up for re-evaluation, and individual Congressmen will be faced with many controversial and conflicting issues to resolve. They will be pressured by specialized interests. It will be difficult for these gentlemen to remember that this growing nation's basic need for a high level of planned highway building is the thing. This goal must not be lost sight of in battling over this provision or that.

It is imperative hence that Congress must be freshly reminded, from back home, that the highway program must go on: that the lofty goal which inspired the expanded program in 1955 must never be lost sight of.

This goal, as those within the industries well know, is to catch up with the motor age with planned road systems that will speed the economic flow of people and goods, accelerate national growth and prosperity, and be a bulwark in defense. In also saving countless thousands of lives, the safer roads thus provided will pay for themselves through accident reduction alone. No public works program ever conceived offers such as high benefit-to-cost ratio.

Helping the American public interpret this story to themselves, and to their congressman, is the task taken on by the new Foundation—*your* Better Highways Information Foundation. Your money is wanted—ten dollars, a hundred, a thousand, or more as befits your personal or company place in the picture.

Wanted also is your active participation with ideas, suggestions, willingness to serve on a committee or aid in your community.

We urge you to read the progress report on pages 95-99 and take your own personal action, now.

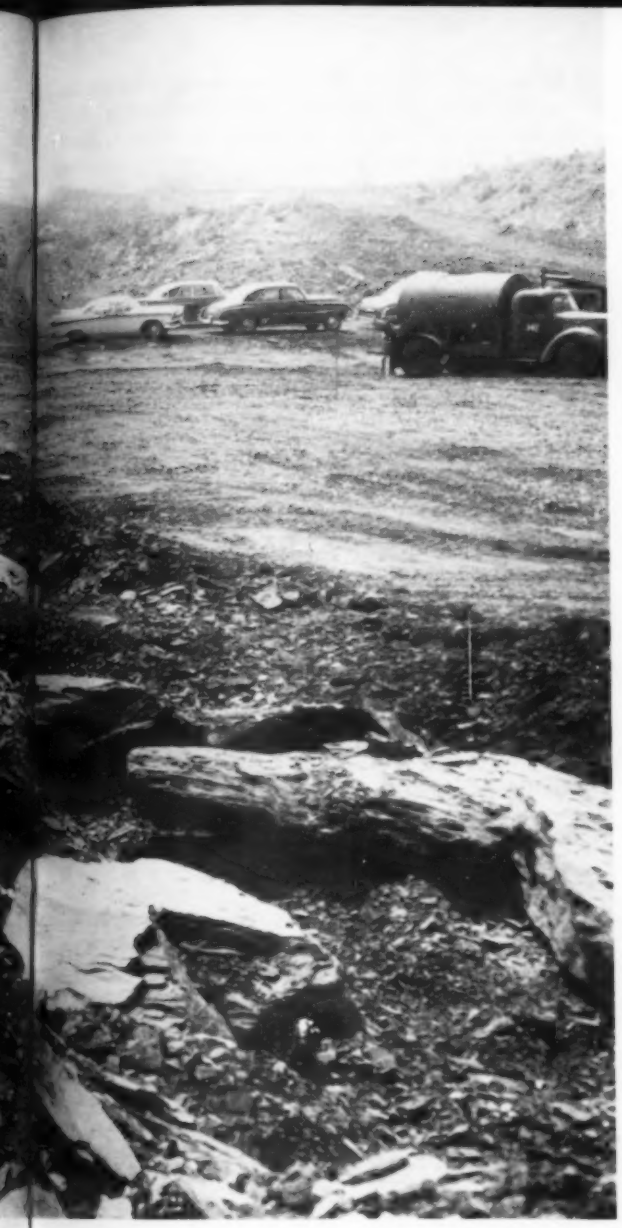
Harold J. McKeever

Big sandstone fragments were deposited to widen the roadway embankment in the "landscaping zone" beyond 2:1 slope. Mine waste is being dumped for extension of landscaping fill to right.

Grading Strategy: Select, Blend, Waste With Least Haul

Grading for today's freeways requires close cooperation between the contractor and the engineers, particularly in getting good quality embankments with extremely variable material. This basic problem is pointed up by the experiences on the job here pictured and briefly discussed.

The project covers 3.2 and 2.1 mile segments respectively of the Penn-Can Freeway (I-81) and the Anthracite Expressway, just outside Scranton, Pennsylvania. The job which includes a large interchange was awarded early in 1960 to Central Penn-



Well shattered sandstone being loaded for use as roadway embankment material.

Slate from coal workings—classified as waste, but permitted as fill in certain roadside areas.

Getting Good Rock Fills
One of a Series

sylvania Quarry Stripping & Construction Co., of Hazleton, and Donald B. Stabler, of Harrisburg, in joint venture, the latter company handling paving. The 2,200,000 cu. yd. of unclassified roadway excavation is three-quarters shovel work. The extremely varied rock, plus a number of special problems, make the project of more than passing interest. A major factor in job planning is a large acreage of coal mine waste which is requiring special disposal. Grading will continue through the coming winter.

Placing small rock for the top 8-in. lift of a roadway fill on project of Central Pennsylvania Quarry Stripping & Construction Co.

Loading select sandstone materials for stockpiling—part of the program of reserving good material as and when found in the excavation, for pavement base and other special use.

Utility lines had to be maintained during the grading, requiring close cooperation between power company, contractor and highway department.

These notes are principally concerned with the ins and outs of getting good quality embankments. The cuts and fills are of moderate depth (50 to 60 ft. maximum), hauls relatively short. The problem has been to dovetail filling with the handling of mine waste, utility relocation and structure work—and to sort, mix, blend, place in alternate layers or otherwise plan load spotting to meet fill specifications with available material.

The rock encountered includes very hard, medium and soft sandstone, and shale ranging from very hard to soft. All rock and shale are suitable for embankment; the chief problem has been to key and/or mix. Rock production is paced around two Marion M-111 4½-yd. shovels loading to Euclid and International rear-dumps and Euclid bottom-dumps.

Grading Requirements

Pennsylvania state highway specifications require that rock be placed in layers not to exceed 2 ft., in contrast with some states which permit layers up to 3 ft. Pennsylvania engineers however believe that thinner layers make a better job and add little if any to the contractor's costs. The state also departs from prevailing rock practice by requiring that *all* material, rock or otherwise, be compacted thoroughly; merely spreading and keying with a dozer isn't considered good enough. Stones up to 18-in. in size are permitted in 2 ft. layers.

Also, the engineers have the privilege of reducing the rock layers to 18 in. or even 12 in., and cutting down the maximum stone size accordingly if in their opinion this is needed to secure a well-compacted and uniform embankment. This requirement focuses on the fact that rock material often graduates down in size and soil content, until the engineer may need to rule that the material is no longer rock but must be placed and rolled as Random Material in 8-in. layers.

Central Pennsylvania's answer for this job's varied circumstances cannot be formally charted except to say that the firm's experienced managers and equipment operators know in general what is needed to get a good rock layer.

Job Procedure

The first work following clearing and grubbing was to remove unsuitable material from embankment areas and scalp cut areas down to rock. This operation plus a start in fill construction totaled about 450,000 cu. yd. in the early summer weeks. Caterpillar DW21 scrapers and D8s and D9s were used, with 10-ton steel rollers and a 50-ton supercompactor for rolling in thin layers. Considerable dirt suitable for embankment was stockpiled for landscaping use due to the shortage of organic topsoil.

Sometimes filling at a given location has come from one shovel; at other times, a blend from both shovels —depending on the fragmentation, fines available or needed for mixing with the larger rocks, and also depending on the length of haul. The chief concern of course is to keep shovels working.

Or, clay-gravel is placed by the scrapers either as carpet layers alternating with rock or as fines for

Continued on page 110

How Good Is the Engineer's Estimate?

A professional cost engineer takes a hard look at the methods often used in estimating public works.

Thomas J. Roche
Cook County Highway Department,
Chicago, Illinois

The training of the Engineer, based as it is on immutable physical laws, tends to make him conscious of "standards" or "universals". This attitude is essential while he is working in any field governed by physical laws. In the field of design he is also encouraged to develop his creative ability unhampered by any restrictions beyond the physical requirements of his design problem.

He will have gained this engineering knowledge in any field of his choice save one—Cost Engineering. Whatever knowledge he must have in this cost field he merely "acquires". That acquired knowledge is not only foreign to whatever engineering he has learned previously, but is contrary to it in its fundamentals. The Engineer who finds himself adrift in the unfamiliar seas of economics and finance may have to jettison much of this ballast of engineering stability when he rides these tides and currents.

The price of a thing is whatever some one will pay for it at any particular time—no more or no less.

Reproduced with permission from remarks given at the recent Houston convention of the American Association of Cost Engineers.

The laws of economics operate on daily human decisions, infinite in number, which create the currents and the tides. When the Engineer grasps that truth he is on his way to becoming a Cost Engineer. When he gives up the notion that somewhere, somehow, the particular costs he seeks are neatly labelled and tabled like chemical formulae or structural steel and trigonometry tables, and instead, strikes out on his own, he has actually become what his title implies—a Cost Engineer.

In his development, he will probably pass through various stages. In his first assignments he may grasp in desperation at any cost figures that remotely fit the project at hand, especially if those figures are in print. At this stage he is still looking for those universal prices that exist some place if only he can locate them.

The Cost Engineer who takes his costs where he finds them, without questioning the controlling factors that determined them, has no knowledge of his margin of inaccuracy. His cost estimate is therefore valueless. The controlling factors are the original plans and specifications, the age of the data, local labor costs and production rates, availability of materials, bidding competition and so on for a dozen more factors. It would probably take longer to check these factors than to compute independent costs. Unless the Cost Engineer is looking for very approximate costs he should avoid the use of such data.

If he bends and twists the order-of-magnitude graphs completely out of shape to fit his needs, he likewise ends up with valueless cost estimates. While such graphs have their definite purposes in obtaining approximate cost estimates, these graphs should be definitely limited to such approximate estimates.

In working with these order-of-magnitude graphs, the Cost Engineer will at first have a tendency to assume they are made to order for his particular project. The fact that they usually reflect nationwide conditions and that they must be fitted to local conditions is often overlooked. Rural costs should normally be less than the graph values, and urban costs should be more.

In urban localities, where the largest amount of construction is usually done, there are cost influences which might be called metropolitan factors. Examples are distributors' costs, haulage and pro-

Continued on page 94

Denton Breaks Concrete Paving Record Again

Four pavers with high-speed plant pave 1½ miles in single day

Roads and Streets Staff Report

The national record for a day's concrete highway paving footage—raised repeatedly in the past two years—has been broken again in Michigan. On August 25, Denton Construction Company of Grosse Point Woods, Michigan, placed 8,036 feet of 9 in. by 24 ft. reinforced concrete slab in a 12-hour working day. This 1½ mile run which involved 3,898 batches capped other days which also exceeded all previous records.

This is the company that made the then-record run of 6,029 ft. in 12½ hours one day in 1958 on US 23 in southern Michigan (Roads and Streets, November, 1958). Denton's footage was subsequently topped several times in 1959 by Michigan and Kansas contractors, Pierson Construction Co. of Saginaw reaching 6,242 ft. This year when the Denton organization took on the paving of 20 dual miles of I-75 between

Here it is—the four-paver train that placed over 1½ miles of full-width road slab on August 25. Two rear pavers (nearest) are loaded on rear side and the two forward pavers in the distance have skips facing forward, to facilitate truck maneuvering. (Roads and Streets photo)

Mackinaw City and Indian River, Michigan, it saw a chance to "do it again."

This job indeed afforded ideal conditions, in that the paving consisted entirely of uninterrupted runs of main roadway. The project's seven bridges had been completed by Johnson-Greene Co., of Ann Arbor, Michigan, the prime contractor, and most of these were overpasses involving no pick-up of the paving train.

The chief job innovation behind this latest record run was the use of *four* 34-E dual-drum pavers. Three Rex pavers placed the first lift. A fourth Rex, with the 3rd paver helping, combined to place the top 3 in., following mesh setting. This is believed to be the first instance of the use of four pavers for a road job, although four are common today on airfield work involving very thick slabs. Denton, incidentally, was one of the pioneers in the addition of a third paver to the traditional two-paver setup.

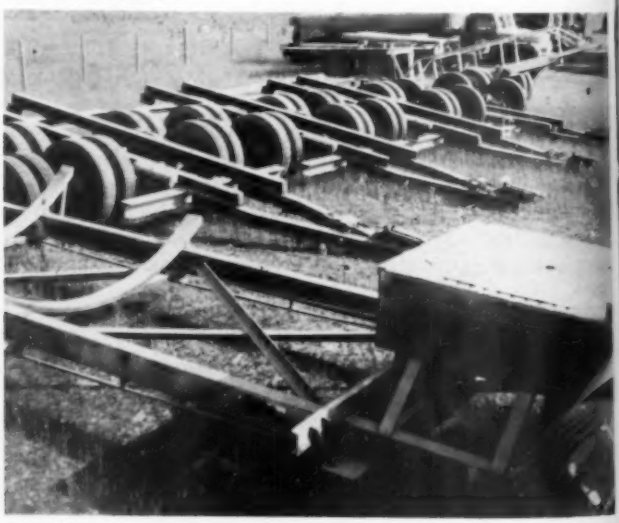
The latest sensational day's production set the statisticians working. For example the run took 26,300 bbl. of cement, equivalent to 66 rail carloads, and represented over $100,000 worth of cement, steel and labor.

Following are notes on some of the equipment and methods used in this high-speed operation. It might be noted here that the setup is remarkably unchanged from two years ago—same project superintendent (Michael Palmer); same batch trucks, kept in good condition, with several new ones added; same spreading and finishing train; same batch plant, with a minor change or two. And—much the same experienced organization of operators, mechanics and helpers. The fourth paver was the immediate key—

The Butler TX4 four-bin batch plant which shared the glory again in Denton's latest record-toppling run.

Balloon tires in batch trucks made a big difference in traversing the soft sand.

Clustered in the plant yard: trainer units built by the Denton shop crew for transporting the batch plant bins and silos between job setups. The plant is knocked down and put on the road in a matter of hours.



and in stepping up the hourly pouring pace, Denton demonstrated that his batch plant and his simple finishing train were both capable of keeping pace and therefore, in the past, had been under-used.

1. The batch plant layout, essentially the same as for Denton's 1958 record-run job on US 23, is sketched here. The plant is a Butler TR-4 Batching System. Four-compartment trucks were loaded in a straight-line run under four bins, one for each aggregate and one for cement. Four batchers at each dropped material simultaneously into four batch boxes, the trucks successively picking up coarse stone, small stone, cement and sand. The entire loading operation usually took between 35 and 40 seconds.

Loading was controlled by the drivers for each of the three aggregates, the driver spotting his truck accurately under the quadruple spouts aided by a mirror. By reaching out and by poking the right button, he opened the four spouts, and another button closed the gates starting the reloading cycle.

The plant's only operator controlled the cement drop by push buttons at a stand alongside the 1,800 bbl. twin silos. He also tallied loads and handed each driver his trip ticket.

The three aggregate bins were kept filled by three crawler cranes each with 2½-yd. Erie clambucket. The cranes traveled along a shuttle path to build up and maintain ample stockpiles. Material for stockpiling was dropped to the rear by three respective electric belts, the belts being fed from incoming trailers via a high-level delivery ramp and gratings.

Besides keeping the cement silos filled, cement was delivered directly from mill trailer to cement batch bins in order to keep up with the overload on the elevator, designed for a lesser production. Two blower-equipped trucks handled this direct feed.

The entire plant was electrically operated from a GM Detroit Diesel generator set, rubber-tire mounted.

2. Batch delivery was planned around 23 company-owned Mack trucks with Marion or Converto bodies. These were B-62, B-42 and B-421 models, many in their third or fourth year of constant use. Rented trucks helped when hauls were longest, but the main point with Denton is that the company owns its trucks and drivers and hence has better over-all control over hauling. For this project which traverses glacial sand, all trucks were modified for sand hauling. Some single-axle units were fitted out with tandem axles. The chief change however was to have special rims built and to fit all wheels with 18.50 x 20 Goodrich balloon tires. Single big tires were used in the rear instead of smaller duals. By going to these tires and controlling pressures between 35 and 45 psi, the Denton management was able to virtually eliminate sand as a slowing obstacle.

Haul road conditions were maintained with a fanatic eye for easy mobility, to assure the success of tight batch scheduling. The usual motor grader work and sprinkler service were always in evidence.

Haul path control was also planned out in advance around the pavers. Batch trucks delivered and returned along the opposite roadway from that being paved. The 90-ft. distance between roadways, across the median, was kept rough graded as a gentle swale of sand using a front-loader and small dozer plus an occasional motor grader pass.

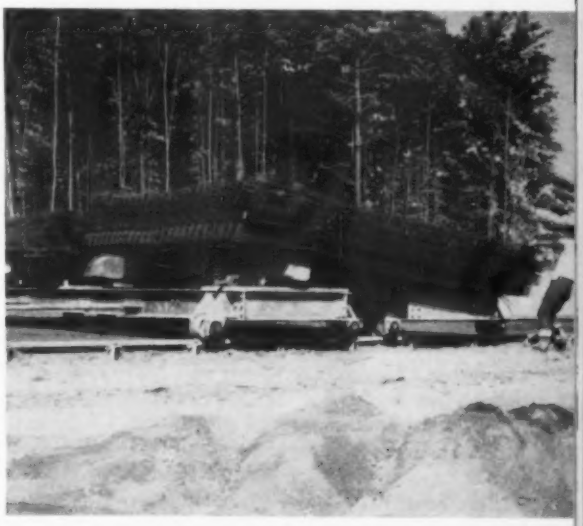
3. The paving train was a simple one. The first 6-in. lift (utilizing three pavers) was struck off by a Jaeger screw type spreader which towed a form riding cart carrying wire fabric. This unit provided vibration along each rail. Behind the last paver the concrete was struck off full-depth by a Jaeger spreader-finisher which also vibrated at joints. Then came a Heltzel finisher with two screeds and a pan float.

Transverse dummy joints were formed at 99-ft. intervals by impressing Styrofoam strips from a bridge (strips later removed and joints edged). A double burlap drag and a curing spray unit completed the form-riding train—just four motorized units including curing applicator.

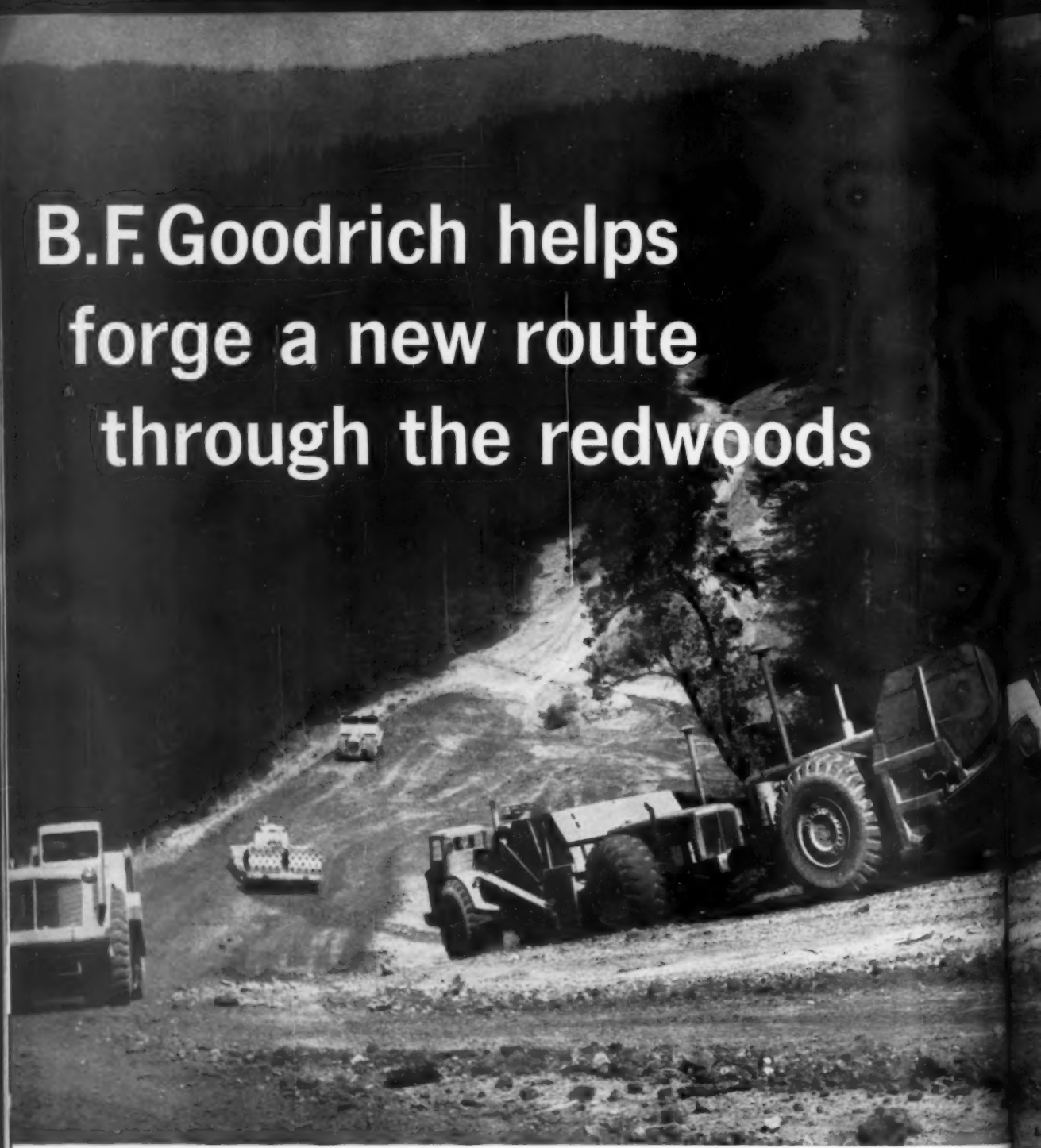
Continued on page 73

Three diesel fuel tankers were kept stationed in the plant yard, as a substitute for laboriously setting and removing a conventional storage tank.

Two men swung fabric panels off, two at a time, in a well-rehearsed operation.



B.F.Goodrich helps forge a new route through the redwoods

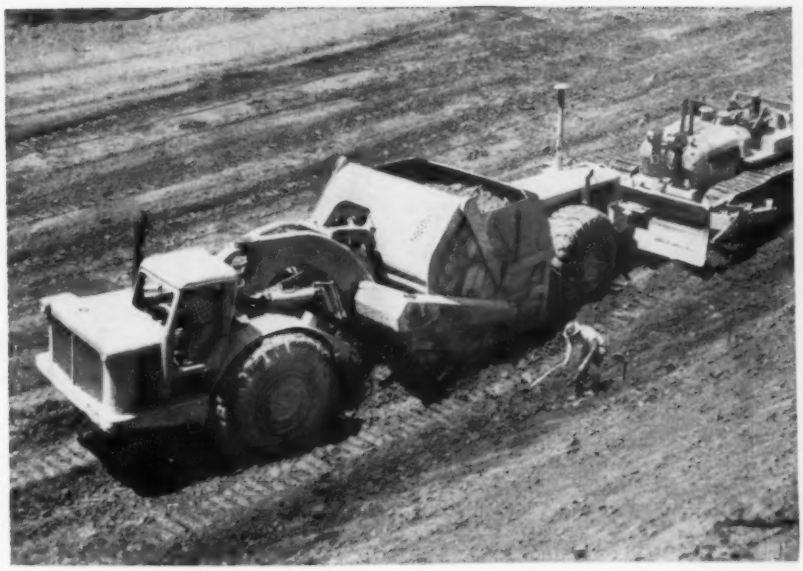


MORRISON-KNUDSEN EARTH-MOVERS climb 42% grade after delivering 35 tons of fill dirt. Equipment works 18 hours a day, 6 days a week, to speed completion of Redwood Highway bypass near Weott, California. B.F.Goodrich Rock Service tires will help move 3,300,000 cubic yards of earth over rocky, mountainous terrain, have performed so well already that many have been retreaded *twice*.

TWO-LANE U.S. HIGHWAY 101 snakes through California's famous forest of giant redwoods—a tourist's delight but a trap for through traffic. To remedy this, a new 4-lane bypass is under construction, 7.5 miles of it by Morrison-Knudsen Co., Inc. On M-K equipment you'll find B.F.Goodrich Rock Service tires.

This $5-million project calls for the excavation of 3,300,000 cubic yards of dirt. Earth-movers haul as much as 35 tons at a clip over ripped rock, twist up and down grades as steep as 42%. Massive B.F.Goodrich Rock Service cleats get a firm, non-slip grip on the ground, pull in forward or reverse.

For work in razor-sharp, tire-killing rock, B.F.Goodrich builds the Rock Service with new Cut Protected compound. BFG Flex-Rite Nylon cords withstand double the impact of ordinary materials, resist heat blowouts and flex breaks. Result: more retreadable tires. Morrison-Knudsen finds Rock Service tires often can be retreaded *twice*.



FOREMAN SETS GRADE STAKES as BFG Rock Service tires shoulder another 35-ton load of fill dirt. Finished 4-lane highway will be 60 feet wide, surfaced with 4-inch-thick asphalt, will have 4 bridges and 100,000 feet of 2" horizontal water drain pipe. B.F.Goodrich on-the-job tire service is available on projects such as this.

RETREADED B.F.GOODRICH ROCK SERVICE TIRE in foreground has already given over 2,200 hours of service (some tires on the project have worked over 3,200 hours). BFG builds the Rock Service in 3 compounds — Regular; Cut Protected (CP) for short hauls over jagged rock; and Heat Resistant (HR) for longer runs at higher speeds.

Supplying contractors with longer-wearing BFG tires and providing on-the-spot tire service that saves time and money are everyday jobs for your B.F.Goodrich Smileage dealer. On many projects B.F.Goodrich supplies everything from tires to boots to belts through its new Unified Contractors Program. Whatever *your* need, it will pay you to check first with your BFG dealer. You'll find him listed under Tires in the Yellow Pages. Or write *The B.F.Goodrich Company, Akron 18, Ohio.*

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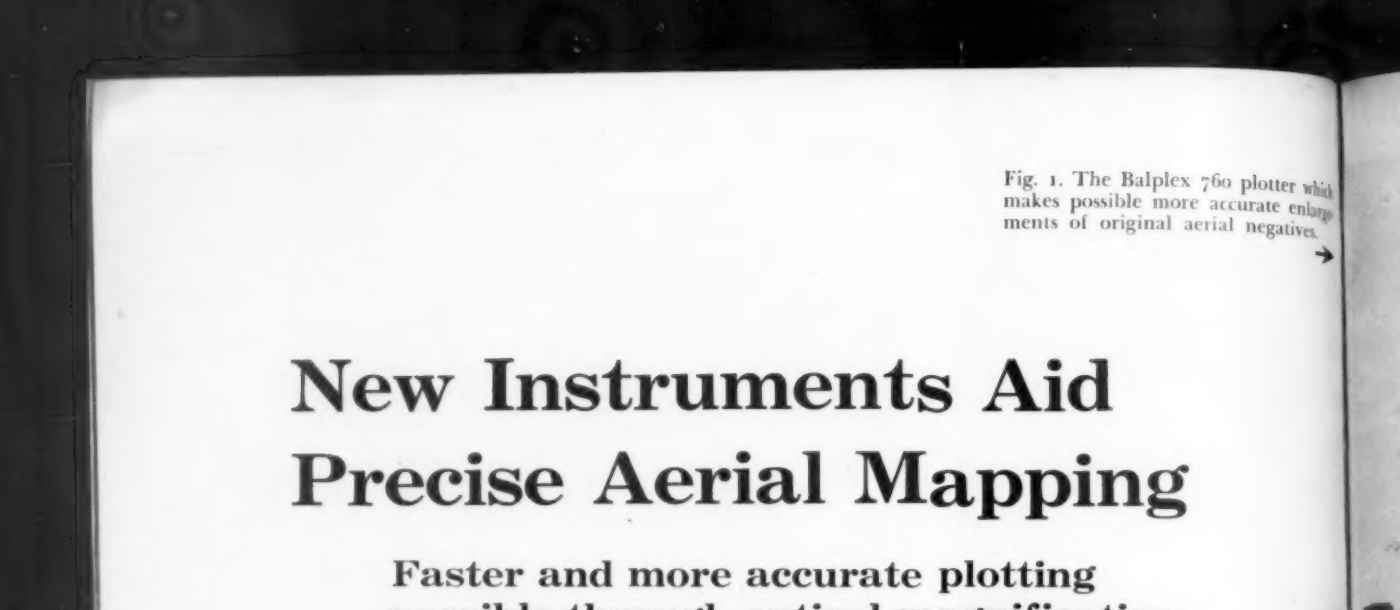


Fig. 1. The Balplex 760 plotter which makes possible more accurate enlargements of original aerial negatives. →

New Instruments Aid Precise Aerial Mapping

Faster and more accurate plotting possible through optical magnification, ground control extension and direct reading of displacement

Large-scale plotting of maps has been made easier and faster for highway and waterway planning, military and other purposes requiring unusual accuracy and detail. The credit goes to improved photogrammetric equipment recently introduced.

The whole science of mapmaking is undergoing a profound revolution in methods and standards as the new systems supplant the slow, tedious and much more approximate methods of geometric projection. Much of the progress is built around a group of correlated and calibrated precision instruments which transform overlapping aerial photographs into accurate topographic maps.

The aerial camera plays an important part in the process. It must be equipped with a specially designed lens, and its performance determines, to a large extent, the accuracy of the final map.

A stereoscopic scale model is formed by projecting a pair of aerial negatives onto a datum plate, utilizing colored filters over the light source. The image is observed through filter spectacles of the same colors, creating the effect of a three-dimensional model from which the map is compiled. To produce a true scale model, a definite relationship of camera to printer to projector lenses must be maintained, as illustrated in Fig. 2.

The plotting scale, 1/D, is the ratio of the distance in the model to the corresponding distance on the earth's surface, and it can be seen that $1/D = P/C \times A/B \times F/H$. The reduction ratio of the printer, A/B, is made equal to C/F, and therefore $1/D = P/H$. Only when this condition has been satisfied can a model be formed with true scale in both vertical and horizontal directions.

Equipment designed to maintain these relationships with extreme accuracy, and to afford fast and convenient tracing and plotting, has been developed by Bausch & Lomb Optical Co., Rochester, N. Y. Known as the Multiplex mapping system, it consists of a reduction printer, projectors, tracing table, frame and supporting unit, and slate or aluminum table top. Linear displacement of the frame which holds the diapositive plates is measured in millimeters and tenths.

Orientation. One of the vital requirements in any such system is to adjust the positions of the two projectors properly. It must be done in such manner that they bear exactly the same relationship to the datum plane, or mapping surface, as that of the aerial camera to the earth's surface at the moment of exposure. This orientation is accomplished in the Multiplex system by mechanical procedures, eliminating the need for any computations. The projectors are provided with six movements, three rotational and three translational. The correct positions of the projectors are rapidly determined through simple, established rules, and by reference to predetermined data.

All points in the adjusted model will be in their correct positions, both vertically and horizontally, and can be recorded on the map sheet.

When the only existing control is in the first model, stereo-triangulation can be done by "extension of control" from one model to the next. However, a more usual procedure is "bridging," which provides control in the models at both ends of the triangulation strip, and often at one or more intermediate points.

This process of orienting a number of additional models to the preceding ones, to form a triangulation strip, is limited only by the number of projectors that can be accommodated on the frame.

Planimetric Features. An orthogonal projection of the terrain's planimetric features is drawn by means of a special tracing table. This table also establishes by accurate measurement the location of points and contour lines and records them on the map sheet. The operator observes a "floating dot" of light, and relates this visually to the apparent ground level in the stereoscopic

Fig. 3. Veeder-Root counter which plays a role in today's more precise plotting of aerial observations.

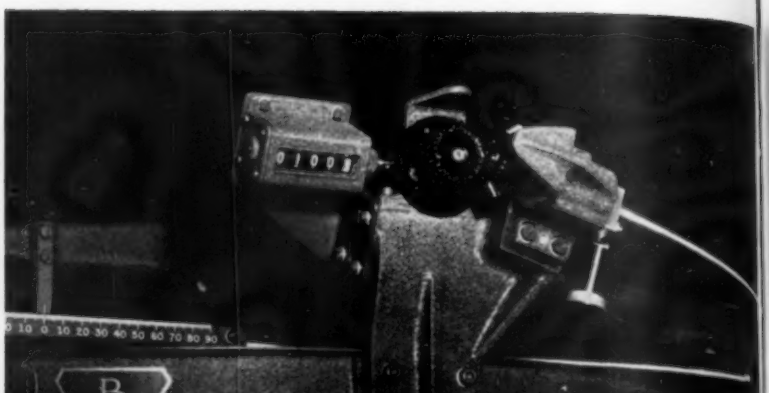


Fig. 4. B & L Auto Focus Rectifier speeds production of rectified prints needed for controlled mosaic maps.

scene. His adjustment of the dot of light to apparent ground level is reflected in a direct reading of elevation shown on the face of a small Veeder-Root counter (Fig. 3).

Both the counter and its integrated gearing are extremely precise. An indication of its sensitivity is obtained from the fact that the surface of the table top, usually of slate or aluminum, must be flat within .001 in. per ft. over its entire area, since it serves as the datum plane from which the measurements are made.

Operation of the tracing table is entirely mechanical, and models are available to read in feet or meters of elevation. The scale chart (Fig. 5) shows the relations between the flight altitude, range of projection distance, and range of usable mapping scales. The tracing table reading in feet has a least

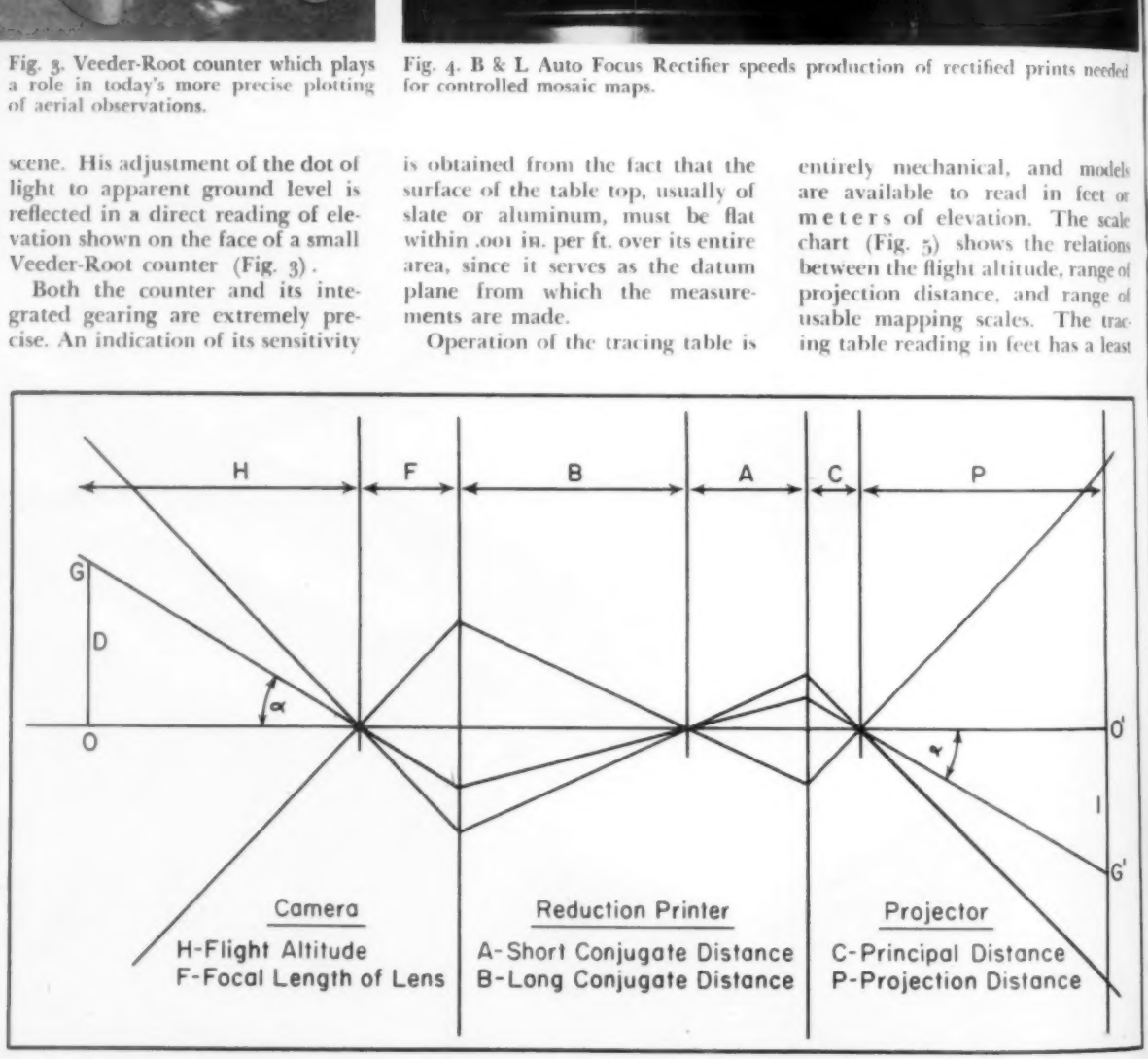


Fig. 2. Illustrating the definite relationship necessary between camera and printer to produce a true scale model.

reading of one foot for the most commonly used plotting scales. In the metric system, a least reading of 0.1 meter is maintained up to a scale of 1:1500. From 1:1500 to 1:4800, the least reading is 1 meter.

The Integrated System. Recently a new plotter, the Balplex 760, has been added to B&L's line of photogrammetric equipment, offering a 5X enlargement of the original aerial negative and greatly increasing the accuracy and large-scale detail of mapping jobs.

Seated at this instrument with the tracing table before him (Fig. 1), the operator sees a small, cone-shaped sapphire as a point of light which acts as his "floating mark." The tip of the sapphire diffuses the light to make it visible from any angle without change of intensity. The intensity may be varied if desired, however, by a rheostat.

Since the accuracy of the operator's work is directly proportional to smooth travel and free movement of the carriage, ball-bearing rollers are held in firm contact with the upright columns, while agate foot pads support the table and glide smoothly over the map sheet.

All vertical movement fed to the knurled wheel at the base of the elevating screw must be transmitted without error or backlash to the counter, where such movement is precisely calibrated and indicated in a direct reading.

Auxiliary Equipment. An invaluable auxiliary to the system described is the Auto Focus Rectifier, an instrument which permits quantity production of rectified prints that are suitable for compilation of controlled mosaic maps.

Negatives up to 9" x 9" format from any focal length camera can be accommodated. When a 6-in. camera is used, the negatives can be magnified through a range of 0.7X to 3.3X and to 20° tilt. A lens shutter provides lens stops from f6.3 to f/32 and speeds from 1/50 sec. to 1 sec. There is a cable release for time and bulb exposures. The negative plane is immobilized to keep the over-all height constant. Tilt and magnification mechanisms are motor-driven and are controlled by micro-switches in hand-held controls.

Manual controls provide for negative displacement of plus or minus 90 mm in both x and y directions, and the displacement is read directly by a Veeder-Root counter mounted on the upper frame of the instrument, facing front. Linear and angular motions are equipped with appropriate scales for proper setting of the instrument. (Fig. 4).

From the foregoing it may be seen that, given a reliable source of aerial photography and a knowledge of surveying by ground and photogrammetric methods, this integrated system provides all the needed facilities for the production of excellent topographic maps.

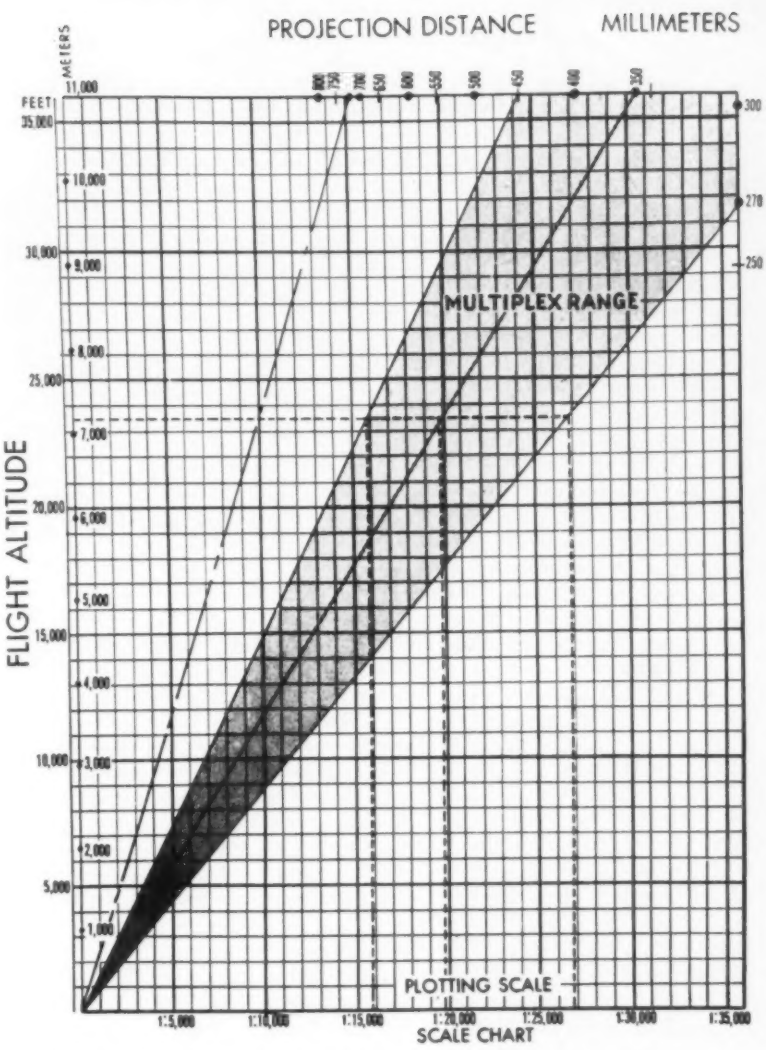


Fig. 5. Scale chart showing relationship between various basic factors.

Flip of Coin Ends Bidding Deadlock

A flip of a coin decided the low bidder on a Michigan state highway contract recently. Involving 20 miles of surface treatment, the job was bid by Proksch Construction Co., of Iron River, and I. L. Whitehead, of Sault Ste. Marie, each submitting identical bids of $44,849.

Officials of the Whitehead firm left before the bids were tabulated the next day.

A conference telephone call was set up between Lansing and officials of the two firms and C. J. (Irish) Carroll, executive secretary of the Michigan Road Builders Association, was called in to flip the coin. Whitehead officials said they would take heads, and the coin turned up tails when flipped by Carroll while three highway department officials watched.

ASTM Holds Session on Soils for Engineering Purposes

The overconsolidation of soils when compacted results in shear strength values higher than that indicated by tests conducted with higher normal pressures, according to R. W. Cunny and R. C. Sloan of the U.S. Army Engineer Waterways Experiment Station. The overconsolidation effect increases with increasing water content within the range used by the authors. Their paper was one of several presented at the session on Soils for Engineering Purposes during the 63rd ASTM annual meeting in Atlantic City, New Jersey, June 26 to July 1, 1960.

The observation of settlement of soft, fine-grained soils was discussed by E. J. Zegarra of M. W. Kellogg Co. Observations made in Delaware, Texas, and Venezuela on samples from borings and from laboratory tests showed that test specimens of soft, compressible clays or silts, especially when they contain a high organic content, are adversely affected by sampling and trimming.

D. J. Bazett and S. W. Smotrych, the Hydro-Electric Power Commission of Ontario, described triaxial compression tests on drained and undrained samples of remolded Niagara clay. Samples tested included samples both in the normal consolidated and overconsolidated states from material with an initial water content equal to the liquid limit. The tests led the authors to conclude that drained and undrained tests had common failure envelopes, when the samples were normally consolidated, or when the samples had the same maximum consolidation pressure.

Studies of the distribution of stress and strain in soil masses, using two full-scale test sections of a runway, were described by R. G. Ahlvin and D. N. Brown of the Soils Division, U.S. Army Engineer Waterways Experiment Station. Two field stress-strain curves were developed for homogeneous soil masses subjected to surface loading. Conclusions indicated that the triaxial test, as normally carried out, does not yield stress-strain relations representative of those effective in prototype soil structures. Through proper preconditioning of specimens and special loading patterns, prototype stress-strain relations can be essentially duplicated in small laboratory tests. It was found that the laboratory test methods, when applied to tests on undisturbed samples from the homogeneous clayey silt test section, yielded stress-strain curves duplicating the field stress-strain curve for all practical purposes.

In construction work, the serious effect of frost action in soils is generally recognized. The rate of freezing and its effect and importance was discussed by E. Penner, National Research Council of Canada, as studied under laboratory conditions. Both saturated and near-saturated moisture conditions were included in the study, with the rate of freezing being measured both in terms of heat flow and rate of frost penetration. The results of the study showed the strong influence of net heat flow from the soil on the heaving rate. The average concentration of ice in the frozen soil, resulting from water moved to the freezing zone, increased as the rate of freezing was decreased for all soils. It was found that the proximity of the water table was not critical for any of the three soils used.

It was found unsatisfactory to compare the frost susceptibility of different soils in laboratory freezing experiments on a basis of equal rates of frost penetration, because the same amount of heat extracted for two different soils does not produce the same frost penetration. The author suggested that the results of this study would be useful in setting up practical laboratory freezing procedures for the realistic evaluation of the frost susceptibility of soils in the field.

MEETINGS

CANADIAN GOOD ROADS ASSOCIATION—41st Convention, Royal York Hotel, Toronto, Ontario; October 17-20.

SOUTHEASTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS — Buena Vista Hotel, Biloxi, Miss.; Nov. 1-4.

NATIONAL SLAG ASSOCIATION—Annual Meeting, Hotel Mayflower, Washington, D.C.; November 3-4.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS—Annual Convention, Detroit, Mich.; November 27-December 2.

THE ASPHALT INSTITUTE—Annual Business Meeting, Sheraton-Park Hotel, Washington, D.C.; December 5-8.

HIGHWAY RESEARCH BOARD—Annual Meeting, Sheraton Park Hotel, Washington, D.C.; January 9-13.

NATIONAL CRUSHED STONE ASSOCIATION—Annual Convention, Americana Hotel, Miami Beach, Fla.; January 17-20, 1961.

NATIONAL LIMESTONE INSTITUTE—16th Annual Convention, Statler-Hilton Hotel, Washington, D.C.; January 17-19.

NATIONAL SAND & GRAVEL ASSOCIATION AND NATIONAL READY MIX ASSOCIATION—Joint Convention, Hotel, Americana, Miami Beach, Florida; January 23-26.

NATIONAL BITUMINOUS CONCRETE ASSOCIATION—5th Annual Convention, Shamrock Hotel, Houston, Texas; January 30-February 2.

ASSOCIATION OF ASPHALT PAVING TECHNOLOGISTS—1961 Meeting, Hotel Francis Marion, Charleston, S. C.; February 6-8.

ASSOCIATED EQUIPMENT DISTRIBUTORS—Annual Convention, Statler Hotel, Los Angeles, Calif.; February 6-9.

AMERICAN CONCRETE INSTITUTE—57th Annual Convention, Chase-Park Plaza Hotels, St. Louis, Mo.; February 20-23.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA—Annual Convention, Hotel Statler, Boston, Mass.; February 26-March 2.

AMERICAN ROAD BUILDERS ASSOCIATION—59th Annual Convention, Chalfonte-Haddon Hall, Atlantic City, N. J., March 5-8.

DENTON'S RECORD PAVING RUN

Continued from page 63

The wire fabric reinforcing mats were delivered by truck along the opposite roadway, and swung over to the form-riding cart by a truck crane stationed in the median area.

Ahead of the paver, the 3-in. granular subbase lift was spread by a motor grader. Forms were handled on and off the truck by a gin-pole on the truck, set back of a formgrader and bedded by two form tampers. A motor grader, Buckeye fine grader, small tandem roller and special towed steel roller drums left the subbase ready for dowel assemblies.

The pavers were supplied by four 4,000-gal. tankers stationed on the opposite roadway, each moving along with its paver. Water trucks were replenished by a 6,000-gal. delivery tanker on a special 16-tired semi-trailer.

A Denton trick, again seen here, was the practice of allowing the hose from each tanker to its paver to drag along the median in an arc. Arriving and departing batch trucks ran over the hose with little damage thanks to the soft ground. This scheme had the advantage of keeping the median clear for the batch trucks. Arriving truck drivers under flag control angled across the median to the designated paver, "Y'd" around when necessary, backed into place, and after unloading angled rapidly back across the median—all without the confusion and constant momentary delays often experienced around the paver on jobs when the tankers are crowded closely alongside.

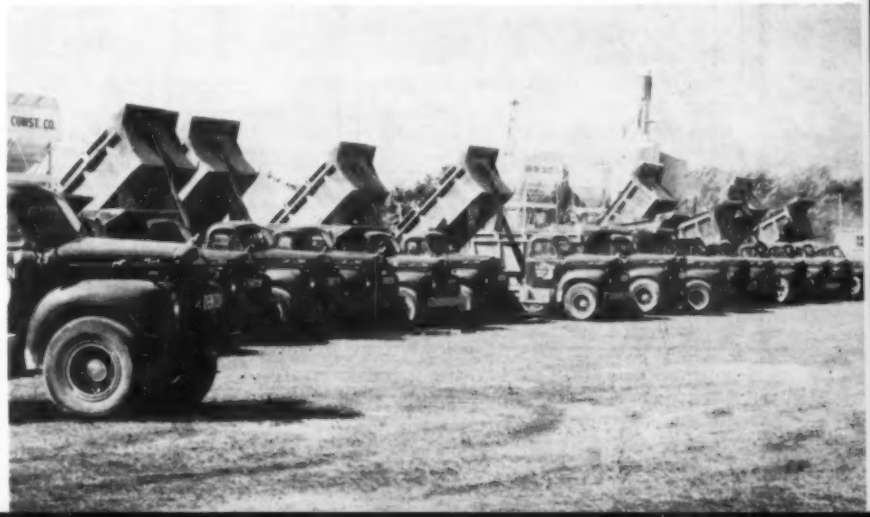
Some over-all comments: The Denton management approach was to keep a balance at all times between batch plant, batch delivery and paving train; and to have storage capacity built into the production at every step of the material flow. For example, at the batch plant, the large stockpiles required two clamshell handlings in addition to belt handling, in lieu of direct belt feed to bins, but this insured against running out of aggregates.

Batch loading was also given a safety margin. By keeping a few more trucks working than were theoretically needed, there was al-

Aggregate supply trailers dumped three belts, each supplying a crane for rehandling to stock pile and then to batch bin (bins located to left of picture).

In the 90-foot median swale—note how the paver's water hose was allowed to drag in an arc from the tanker on the opposite roadway. Also how arriving and departing batch trucks "Y"ed across the sandy median with their flotation tires.

Mack batch trucks—Denton owned and maintained—lined up on a Sunday in spacious plant yard.

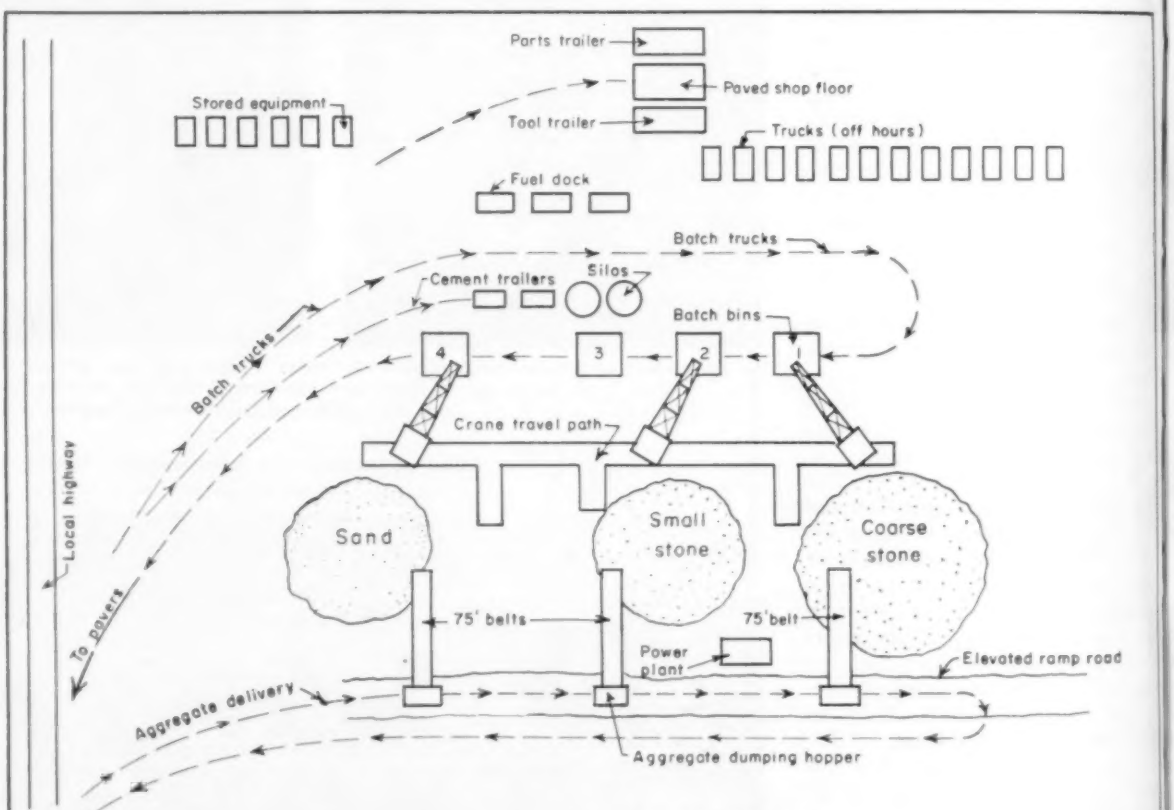


Water tanker—one for each paver—traveled along on the opposite roadway. 6,000-gal. supply tanker (with square tank) is refilling nearest trailer.

ways a truck waiting its turn to make the run under the batcher spouts. And at the paver, the rule was to keep a second batch truck in position immediately behind the truck supplying the skip; not even a second's delay was countenanced in raising the skip to start the 60 second mixing cycle.

Cement from the mill and aggregates from the commercial suppliers also had to be always on hand, with one double-bottom load being dumped and another waiting its turn.

For Denton Construction Company this job was part of another full season. Before coming onto the I-75 project here reviewed, the outfit handled a small job elsewhere. And after completing the 523,000 sq. yd. between June 27 and September 2, it moved on to complete another 130,000 sq. yd. run and try to get done on a fourth 160,000 sq. yd. job by autumn shut-down. Completion of



Denton Construction Company's batch plant and yard layout—almost identical with the one which helped the company set its 1958 high-mark in paving footage. Note how batching is done in a straight, four-stop run; and how belted material is rehandled, first into a stockpile then into bins, as part of the scheme to insure flexibility and continuity of operation.

this grist of work will bring to about 3,500,000 sq. yd. the amount of concrete road paving handled by the Butler TX-4 plant since it was purchased in January of 1957 at the Road Show in Chicago. The only changes made in this plant since its purchase was the addition, this past season, of compressed air delivery to augment the screw delivery of cement to the silos.

Sharing the credit for Denton Construction Company's job performance were C. C. Leduman, general superintendent, and Michael Palmer, job superintendent. Credit is also due to the excellent cooperation by the Michigan state highway department's staff in inspection and other supporting field work, under Frank Deschamps, district road engineer and Charles Lundberg, road construction engineer. C. B. Laird is chief construction engineer of the Michigan Department, of which John C. Mackie is commissioner.

Some Equipment Used

Batch Plant—Butler TX4 System
Power for Plant—GM Detroit Diesel-electric unit
Pavers—Rex 34E dual drum
Spreaders—Jaeger
Finisher—Heltzel
Road Forms—Metaform
Batch Trucks—Mack
Flotation Truck Tires—Goodrich
Formgrader—Cleveland
Mesh Carrier—Cleveland
Mesh and Joint Steel—Bethlehem
Curing Compound—Murphy-Phoenix
Air Entraining Agent—Darex
Concrete Saws—Concut
Joint Seal—Servicized Zeroplastic
Greasing Equipment—Alemite
Cranes—Bucyrus-Erie 38-B, Koehring 605 and Link-Belt with Erie Clambuckets; Bucyrus-Erie truck-crane for general work
Fuel Supply—Standard (Indiana)
Portland Cement—Penn-Dixie

Wyoming 'Need' Study

Wyoming has a $593 million job ahead to modernize its state highway during the next 20 years. So stated a report on a need study made by the Automotive Safety Foundation, Washington D. C.

Job Safety

The High Cost of Job Accidents

Thousands of people are killed or maimed every week on industrial jobs. Nearly all of them can be charged to the attitude of the worker. If the worker has the wrong attitude about safety he will, sooner or later, kill or injure himself or someone else. He must be safety conscious to prevent accidents. Too many workmen, foremen and superintendents think that accidents just happen—that you're going to have one every once in a while anyway.

This just isn't so. Accidents are caused.

And they are caused by carelessness, thoughtlessness and unsafe working practices.

The Bureau of Public Roads is concerned about the number and cost of accidents in the expanded road program. Estimates from the U.S. Bureau of Labor Statistics for the year 1959 show that about 217,000 contractor workers were disabled. About 2,500 were killed and another 6,300 were permanently impaired or disabled. It is apparent that the accident frequency rate for highway construction is higher than for the construction industry as a whole. The construction industry ranks as the most hazardous of the major industries in our national economy.

The Bureau estimates the monetary loss to the road building industry in direct and indirect costs of highway construction accidents, at $170 million in 1959. It makes good business sense for you to have a good, sound, safety program in your organization. Accidents are expensive and you can increase your margin of profit by preventing them on your job.

(From a bulletin of the Virginia Road Builders Association to its contractor member companies.)

State Asked to Share Job Flagging Costs

Participation in flagging costs on road projects by the highway department as well as the contractor generally results in better work. At least this is the opinion of spokesman for the Constructors Association of Western Pennsylvania.

In its recent bulletin to member contractors, the association went on to note that dual or shared responsibility in flagging costs results in better handling of this aspect of project safety. Several state highway departments have provided in their specifications for sharing the labor costs for flagging.

The AGC-AASHO joint committee is making material on this plan available to all highway departments and the AGC highway chapters, the bulletin said. The trade practice committee of the Constructors Association of Western Pennsylvania is presently studying the plans with expectation of submitting a formal proposal to the Pennsylvania Department of Highways on the matter.

First-Aid Training

An experimental first-aid training program for employees of the Michigan state highway department has been successful and will be continued on a permanent basis, Director for Administration Frederick E. Tripp announced recently. At the same time, first-aid kits are being placed in all highway department vehicles—cars, trucks, snow plows and other equipment.

Two trial first-aid courses were held during the past winter, with 27 employees taking the 10-hour course on a voluntary basis after working hours.

FIFTY-EIGHT MEMBER FIRMS of the Ohio Contractors Association were recently honored with presentation of No-Lost-Time Accident Awards for the period October 1, 1958, to September 30, 1959. The reporting program is part of the over-all accident prevention activities of the Association. To be eligible for an award a contractor must have had at least 10,000 man-hours of exposure, submitted a report for each month during the period, and experienced no lost-time accidents.

INTERNATIONAL R-LINE six-wheelers (right) save time, reduce bog-down and slow-down problems by providing maximum flotation and traction. Six-cylinder engines up to 501 cu. in. displacement are available with gasoline or LPG power. Gear reduction of over 100-to-1 multiplies engine torque to tandem axle to assure smooth, powerful performance. GVW ratings up to 53,000 lbs.

INTERNATIONAL V-LINE dump trucks (below) are ideal for exacting operations. Powerful gasoline V-8 engines with up to 257 hp. supply the power needed to come out of rough areas with king-size loads plus a high average road speed to cut trip time. Also available with LPG and diesel power supplying 695 lb-ft. of torque. Extra heavy-duty frames, brakes and front end can really stand long term punishment. GCW ratings exceeding 100,000 lbs.

INTERNATIONAL is always ready to serve and solve your transportation needs!

INTERNATIONAL six-wheel dump trucks have "take-any-terrain" ruggedness and maneuver easily in "tight" working conditions – just two reasons why they do their job right and on time. They're built to get in *and* out. Whatever INTERNATIONAL dump truck model you select, you can be assured of maximum power-performance every day of the year. See your INTERNATIONAL Dealer or Branch today for full details.

When schedule demands pinch your operation, and you need a dump truck right away—six-wheeler or single axle—call on your INTERNATIONAL Truck Dealer or Branch. Within 24 hours, dump truck models in popular sizes and specifications are ready for shipment from the INTERNATIONAL Truck Sales Processing center. This "pool" has been made famous by getting complete units in the field when you want them. Through anticipation and knowledge of your emergency needs and equipment demands, INTERNATIONAL is prepared to keep your job on schedule.

Model Series	RF-192	BCF-182	B-184	B-182	B-164
Gross Vehicle Rating	43,000	35,000	24,000	21,000	19,000
Body	8-10 Yd.	8 Yd.	4 Yd.	4 Yd.	4 Yd.
Wheelbase	157 in.	149 in.	141 in.	141 in.	129 in.
Engine	450 cu. in.	345 cu. in.	345 cu. in.	345 cu. in.	304 cu. in.
Transmission	5-speed Direct, 3-speed Auxiliary	5-speed Direct, 3-speed Auxiliary	5-speed Direct	5-speed Direct	4-speed Synchro-mesh
Rear Axle and Capacity	34,000 single-reduction tandem	28,000 single-reduction tandem	18,500 2-speed	16,000 2-speed	15,000 2-speed
Tires	9.00 x 20 10 ply	9.00 x 20 10 ply	10.00 x 20 12 ply	9.00 x 20 10 ply	8.25 x 20 10 ply
Frame Reinforcements	Inverted "L"	Inverted "L"	Inverted "L"	Inverted "L"	Inverted "L"
Heavy Duty Springs			Front & Rear	Front & Rear	Front & Rear

INTERNATIONAL® TRUCKS WORLD'S MOST COMPLETE LINE

INTERNATIONAL HARVESTER CO., CHICAGO • Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

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Sharp Last-Half Rise Seen In

A probable 25 percent or better increase is now in sight for state highway construction contract awards for calendar 1960, as compared for 1959.

This is the conservative estimate based on a Roads and Streets survey, the results of which are here tabulated.

Actually this tabulation shows a picture that is probably too rosy (the indicated jump here is 35 percent). The figures (from $3.042 billion to $4.126 billion) need some adjustment, for one thing because, the calendar 1959 total of awards reported to the Bureau of Public Roads was $3.237 billion as compared to the $3.042 reported to Roads and Streets.

And some of the award estimates for the last two 1960 quarters are believed to be overly optimistic, due to the engineering work load involved (and this being an election year). This table however represents signed questionnaire returns from 48 states and District of Columbia, Hawaii and Alaska are omitted for lack of comparative figures available at press time.

Even discounting some of the "ifs," the rise in state road jobs that will be placed in 1960 will represent one of the sharpest and largest snap-backs in highway program history. The outlook has improved steadily since the 19 percent prediction was made last month in the Steptember Roads and Streets Washington Newsletter. In the weeks since mid-July the cumulative calendar-year award volume has caught up with the comparable figure for the same period in 1959. Week by week this autumn the "plus" has crept higher, with bridge job awards in particular running far ahead.

Whatever the final figures, there is nothing but good news in sight during the weeks ahead for the job-starved highway contracting fraternity and their equipment and material suppliers. This year promises to be second only to 1958 in dollar volume of state road contract awards.

Taking a detailed look at the tabulation, it is seen that payments to road contractors by the state highway departments for the calendar year will be slightly down from 1959—from $3.607 billion to an estimated $3.424 billion. This is to be expected as a consequence of the slowing of federal funds for Interstate and other projects that began more than a year ago.

The most interesting thing about this tabulation is the pattern of award volume, state by state. Of 48 states reporting, 39 predict a rise in award volume. Some of the biggest jumps percentage-wise: Rhode Island, awards will be nearly quadrupled; Nevada and Virginia, about tripled; Colorado, Idaho, Indiana, Missouri, Montana, New Mexico,

State	CONSTRUCTION CONTRACT Calendar 1959	Calendar 1960 1st Half	Calendar 1960 3rd Quarter (Estimated)
Alabama	$ 63,047,497	$ 42,874,014	$ 25,000,000
Arizona	32,818,296	15,075,979	11,000,000
Arkansas	54,686,600	22,228,498	6,550,415
California	221,667,500	188,345,100	111,000,000
Colorado	24,059,536	21,545,154	12,799,500
Connecticut	53,297,942	12,523,966	6,800,000
Delaware	7,811,778	5,907,173	400,000
Florida	112,048,000	55,085,121	28,000,000
Georgia	64,800,000	27,750,000	20,000,000
Idaho	16,626,219	11,634,263	11,488,000
Illinois	204,498,000	123,412,000	69,395,000
Indiana	44,036,083	18,148,514	27,000,000
Iowa	71,803,872	45,751,330	16,000,000
Kansas	53,171,828	36,937,982	19,500,000
Kentucky	62,905,575	21,433,801	22,000,000
Louisiana	86,837,115	61,540,000	18,000,000
Maine	15,104,417	8,580,215	5,600,000
Maryland	31,913,186	23,741,668	6,510,716
Massachusetts	92,314,000	25,240,000	45,000,000
Michigan	138,347,137	123,626,456	45,981,500
Minnesota	55,851,887	23,481,178	19,000,000
Mississippi	45,192,000	18,872,000	11,178,000
Missouri	71,128,837	68,127,860	32,000,000
Montana	20,621,116	20,012,009	10,000,000
Nebraska	32,328,082	22,320,402	10,595,375
Nevada	7,560,860	8,148,433	2,800,000
New Hampshire	19,443,000	9,504,000	7,165,000
New Jersey	51,589,789	18,307,737	19,000,000
New Mexico	21,796,752	19,849,437	12,000,000
New York	228,830,926	104,960,006	86,899,722
North Carolina	60,100,180	21,753,200	15,000,000
North Dakota	35,472,149	19,360,787	5,943,090
Ohio	125,065,342	79,243,986	57,500,000
Oklahoma	25,386,726	16,183,788	15,144,648
Oregon	33,149,808	31,632,566	13,500,000
Pennsylvania	61,437,896	63,706,321	48,531,626
Rhode Island	5,225,744	5,850,950	5,114,000
South Carolina	55,705,168	24,954,005	12,500,000
South Dakota	32,965,278	19,334,881	16,500,000
Tennessee	52,471,574	41,777,979	22,100,000
Texas	254,457,561	113,221,180	62,590,351
Utah	28,000,000	10,700,000	11,100,000
Vermont	29,916,000	10,742,000	5,298,000
Virginia	41,911,432	45,176,177	35,048,613
Washington	46,906,000	22,927,700	40,000,000
West Virginia	28,033,000	11,911,820	9,641,480
Wisconsin	64,578,000	22,634,500	31,000,000
Wyoming	32,634,707	18,349,012	9,216,700
District of Columbia	23,552,025	14,594,820	8,000,000
TOTALS	$3,042,095,420	$1,799,019,968	$1,142,391,736

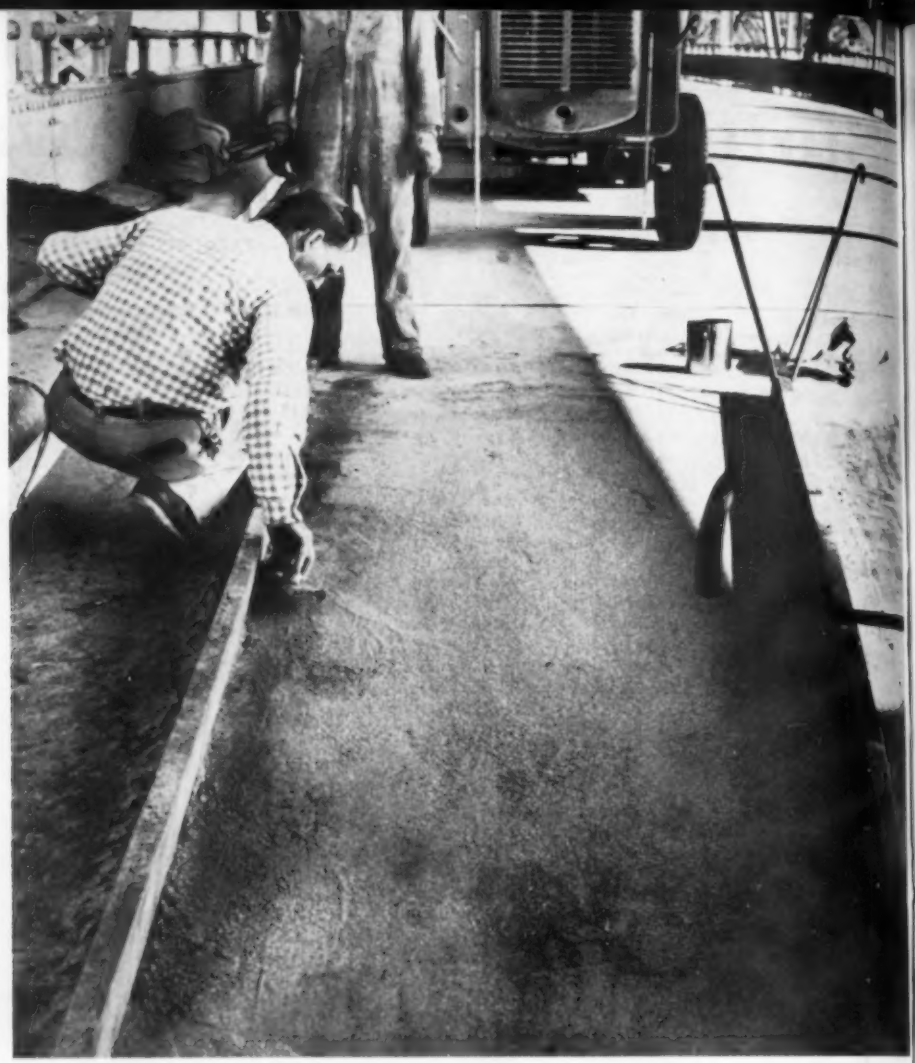
State Highway Job Awards

AWARDS		PAYMENTS TO CONTRACTORS Calendar 1960				
4th Quarter (Estimated)	Entire Year (Estimated)	Calendar 1959	1st Half	3rd Quarter (Estimated)	4th Quarter (Estimated)	Entire Year (Estimated)
$ 24,000,000	$ 91,874,014	$ 60,622,800	$ 26,551,492	$ 18,000,000	$ 1,600,000	$ 46,151,492
11,000,000	37,075,979	32,437,000	19,656,000	9,500,000	8,000,000	37,156,000
8,900,000	37,678,913	31,224,783	17,381,884	9,573,655	8,575,203	35,530,742
80,000,000	379,345,100	201,678,000	80,158,000	70,000,000	60,000,000	210,158,000
12,012,500	46,357,154	38,748,000	11,902,000	12,000,000	8,000,000	31,902,000
23,000,000	42,323,966	52,411,000	17,370,300	14,000,000	12,500,000	43,870,300
2,102,354	8,409,527	12,570,138	3,617,643	1,810,000	2,500,000	7,927,643
30,000,000	113,085,121	111,998,514	63,939,533	33,500,000	34,000,000	131,439,533
30,000,000	77,750,000	64,400,000	23,375,000	18,000,000	22,000,000	63,375,000
11,744,000	34,866,263	24,486,139	5,563,841	10,000,000	6,446,000	22,009,841
27,202,000	220,009,000	213,108,000	79,461,000	69,714,000	68,994,000	218,169,000
30,000,000	75,148,514	80,702,928	23,421,804	30,000,000	26,000,000	79,421,804
18,400,000	80,151,330	94,821,979	18,454,186	47,000,000	29,500,000	94,954,186
12,500,000	68,937,982	71,911,110	15,630,954	22,000,000	15,000,000	52,630,954
25,000,000	68,433,801	99,476,076	20,395,144	14,378,000	7,000,000	41,773,144
17,000,000	96,540,000	106,338,000	71,740,000	25,000,000	15,000,000	111,740,000
4,000,000	18,180,215	25,066,160	7,796,580	7,500,000	5,000,000	20,296,580
16,355,000	46,607,384	50,158,889	10,256,840	10,440,000	8,840,000	29,536,840
47,000,000	117,240,000	75,817,000	61,562,000	17,550,000	44,680,000	123,792,000
96,051,400	265,659,356	162,433,000	41,495,000	80,036,000	59,455,000	180,986,000
20,000,000	62,481,178	57,916,780	12,958,278	20,000,000	22,000,000	54,958,278
8,961,000	39,011,000	43,237,353	14,542,000	15,406,000	12,947,000	42,895,000
32,000,000	132,127,860	83,098,468	21,198,615	36,000,000	31,600,000	88,798,615
16,000,000	46,012,009	32,217,576	8,133,109	14,000,000	10,000,000	32,133,109
17,882,000	50,797,777	36,393,095	10,263,454	14,000,000	14,000,000	38,263,454
7,300,000	18,248,433	14,335,675	1,929,944	4,500,000	3,000,000	9,429,944
6,918,000	23,587,000	25,167,000	8,416,000	9,000,000	7,000,000	24,416,000
31,000,000	68,307,737	49,747,208	22,319,774	15,000,000	18,000,000	55,319,774
12,000,000	43,849,437	38,294,559	26,084,260	7,500,000	7,500,000	41,084,260
100,000,000	291,859,728	323,700,000	94,600,000	106,000,000	87,000,000	287,600,000
12,000,000	48,753,200	58,881,519	23,828,133	18,000,000	17,000,000	58,828,133
2,400,000	27,703,877	39,202,775	6,146,000	16,500,000	9,966,000	32,612,000
78,900,000	215,643,986	129,471,036	53,638,955	75,000,000	48,000,000	176,638,955
11,761,650	43,090,086	63,443,798	17,508,815	7,250,000	7,500,000	32,258,815
19,500,000	64,632,566	55,733,255	12,939,187	18,200,000	15,700,000	46,839,187
62,762,053	175,000,000	187,090,121	36,484,223	47,251,624	53,581,011	137,316,858
10,990,000	21,954,950	10,713,589	3,739,087	2,345,142	2,591,732	8,675,961
7,700,000	45,154,005	57,116,968	24,145,489	16,000,000	15,750,000	55,895,489
4,500,000	40,334,881	37,597,335	9,829,054	17,500,000	9,000,000	36,329,054
22,100,000	85,977,979	61,541,286	26,969,102	27,500,000	16,500,000	70,969,102
58,603,845	234,415,376	270,960,800	102,197,591	60,264,400	54,153,996	216,615,987
7,400,000	29,200,000	29,600,000	11,700,000	9,000,000	7,200,000	27,900,000
5,525,000	21,565,000	11,549,000	2,899,000	3,500,000	3,000,000	9,399,000
35,434,415	115,659,205	58,712,449	16,873,400	17,000,000	12,000,000	45,873,400
24,175,400	87,103,100	48,243,300	13,554,400	13,300,000	9,200,000	36,054,400
14,838,700	36,392,000	46,834,000	14,725,000	18,100,000	14,300,000	47,125,000
15,000,000	68,634,500	79,437,000	15,742,000	35,000,000	25,000,000	75,742,000
8,039,186	35,604,898	32,937,956	10,527,951	13,075,062	7,540,002	31,143,015
5,200,000	27,794,820	13,701,870	11,381,860	5,000,000	4,000,000	20,381,860
$1,185,158,503	$4,126,570,207	$3,607,285,287	$1,255,003,882	$1,181,193,883	$ 988,119,944	$3,424,317,709

Oregon and Washington, approximately doubled.

Dollar-wise, the biggest gains are in prospect in California ($379 million vs. $221 million), Michigan ($265 million vs. $138 million); Ohio ($216 million vs. $125 million); Pennsylvania ($175 million vs. $61 million).

What these figures do is spotlight the zig-zag course of the road program in the various states, as precipitated by the recent combination of switching to a need basis in fund apportionments and of applying contract controls. States that had plans ready, and were able to get big award volumes on the books quickly when the Interstate program was first enacted, were later penalized and the "adjustments" are still going on. The feast-vs-famine climate thus created is one of the long-range aspects of the federal highway program that is certainly to be taken up when Congress meets in 1961.



Worker gives final touches to one section of the repair work. Compound is chemically cured, assuring tight bond to base concrete.

Adhesive Mortar Patches Deck Overnight

How to fill a rut or dip in a concrete bridge roadway, quickly yet with watertight permanence, was demonstrated recently by a remedial project on the Richmond-San Rafael Bridge in California.

In need of repair was a dip in the bridge roadway. Caused by failure of mortar surfacing, it was a potential threat to highway safety. Up to ¾ in. deep and 10 ft. wide, the dip stretched 36 ft. across several lanes.

The conventional repair technique would have required removal of base concrete until some of the reinforcement steel was bared, then placing new concrete to the desired level. As a time and cost saver, the decision was to make the repairs instead with a polysulfide modified epoxy mortar—a mixture of the adhesive and aggregate.

Sandblasting was done to clean off loose particules and oil film in order to give the mortar a good bonding surface. Then the adhesive mixture was prepared as developed by the Division of Highways. It consisted of LP 3 liquid epoxy resin, liquid polysulfide polymer and curing agent. After these ingredients were properly mixed, enough white filler was combined to give the finished mortar a concrete-like appearance to match the rest of the roadway. The adhesive was poured into a mortar box and combined with aggregate in a one to fifteen ratio. Then the mortar was applied. The mixing was done in small batches and applied in sections about 2′ x 10′.

Actual application of the mortar

Continued on page 82

BUTLER TX-4 SMASHES TWO WORLD'S RECORDS

AUGUST 11

August 11 — Highway 31 near Mackinaw City, Michigan, Denton Construction Co. laid 7250 lineal feet of 24 ft. pavement 9 inches thick, in 12 hours, with a 4 bin BUTLER TX-4 Roadbuilders Plant. Each bin equipped with 4 batchers to feed 4 pavers.

AUGUST 25

August 25 — Same highway — same BUTLER TX-4 plant; same number of pavers: Denton laid 8036 lineal feet! Both these paving performances broke Denton's own 1958 record of 6029 feet of 24 ft. pavement, 9 inches thick. The August 25 demonstration of batching genius stands unapproached.

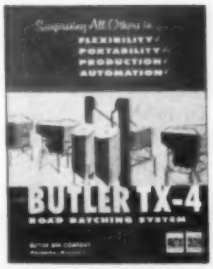
Does anyone want to try? Then get yourself a BUTLER TX-4. That, of course, is the primary and essential requisite.

HERE ARE INTERESTING HIGHLIGHTS

In the August 25 record each batch contained 728 lbs. of cement, 1586 lbs. sand, 1532 lbs. fine stone and 1512 lbs. of coarse. In 12 hours Denton used 26,300 bbls. of cement — equivalent to 66 railroad cars. And the BUTLER TX-4 plant handled 3898 separate batches on that historical day!

BUTLER BIN COMPANY

959 Blackstone Avenue
Waukesha, Wisconsin



Send for new, detailed, profusely illustrated Bulletin on the BUTLER TX-4 Road Builders Plant. Just a postcard will do — but write today.

. . . for more details circle 283 on enclosed return postal card

(Left): Sand is blended into adhesive compound to make enough mortar that will be applied to roadway, to do one section at a time. (Right): As one worker puts mortar on the road, the other works the screed to level the material into place.

ADHESIVE MORTAR PATCH

Continued from page 80

was similar to spreading concrete. As the void was filled with shovels of mortar, a screed was worked over the material to smooth the surface. Since little solvent was used in the compound, shrinkage was not a problem. Sand was sprinkled over the application, and a wood float used to smooth the material.

Curing time for such lessens as air temperature go up; at 80° F the mortar takes traffic in about 12 hours. By applying heat the curing time could be reduced to one hour. The highway engineers compromised by heating the applied mortar for about 30 minutes with propane burners, and leaving the lanes closed overnight. Actually the road could then have been opened within four hours without damage to the resurfaced area.

The California Division of Highways has experimented with polysulfide modified adhesives since 1953, with numerous applications reportedly serving well after five and six years.

Traffic Safety

Study to Correlate Roadway and Accidents

The Automotive Safety Foundation, a non-profit research organization of Washington, D. C., will direct a study of the effects of traffic control measures and roadway design on traffic accidents under a contract with the Bureau of Public Roads.

The ultimate aim is to reduce traffic accidents by giving highway and traffic engineers data on the safest types of roadway design and traffic control measures.

Costs of the study, which is to be completed this year, will be shared jointly by the two organizations. Immediate objectives:

1. Summarize all available information on the effects of roadway elements such as pavement and shoulder widths, curvature, grades and sight distances, and traffic control devices and measures such as signs, signals, markings, speed zoning and channelization;

2. Identify proven cause and effect relationships;

3. Single out the areas in which additional research is needed to establish possible relationships between traffic accident experience and roadway elements and traffic control measures;

4. Prepare one or more reports in non-technical language, liberally referenced, for professionals and laymen;

5. Compile a complete bibliography of available information.

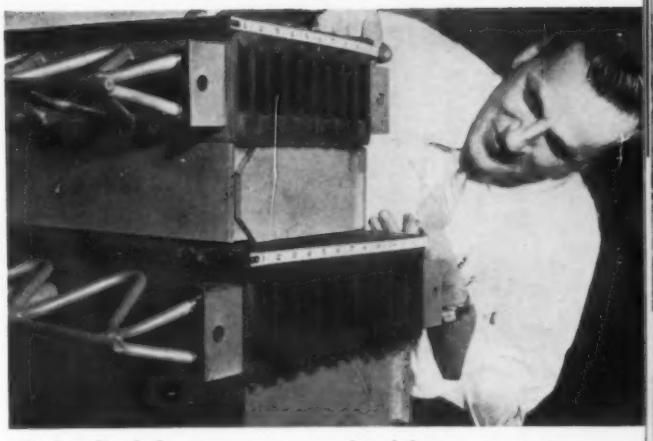
THE NEW JERSEY TURNPIKE AUTHORITY has awarded a $2,036,000 contract to Whitmyer Bros., of Hammonton, New Jersey, to erect 75 miles of median barrier in the southern section of the 118 mile turnpike.

Aluminum guard rail will be set from milepost 0 to 13.41; galvanized steel from mile post 13.41 northward with exceptions to milepost 90. (About 13 miles here already has a median and another section is so wide none is needed.)

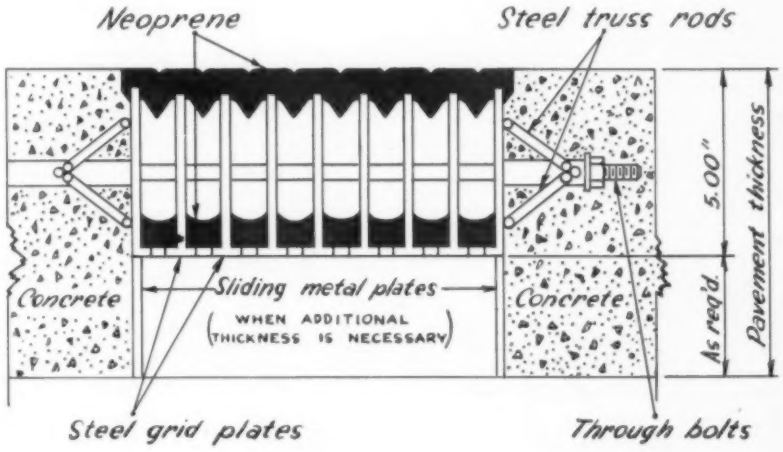
With the erection of this new median, the entire turnpike will be so equipped except along the wide median in Woodbridge. The barrier is designed to prevent cars out of control from crossing the median and causing accidents.

A study by the Bureau of Highway Traffic of Yale University showed that in certain sections of the turnpike the safety record was below that of other sections in 1957.

Neoprene expansion joints are precompressed before being installed. The precompression holding pin which juts above the neoprene surface directly opposite the nut being tightened is removed after the concrete has hardened.



Each cell of the neoprene expansion joints can accept ⅜ in. of movement. This allows for expansion and contraction of the concrete in the highway, bridge, or runway.



New Expansion Joint Designs

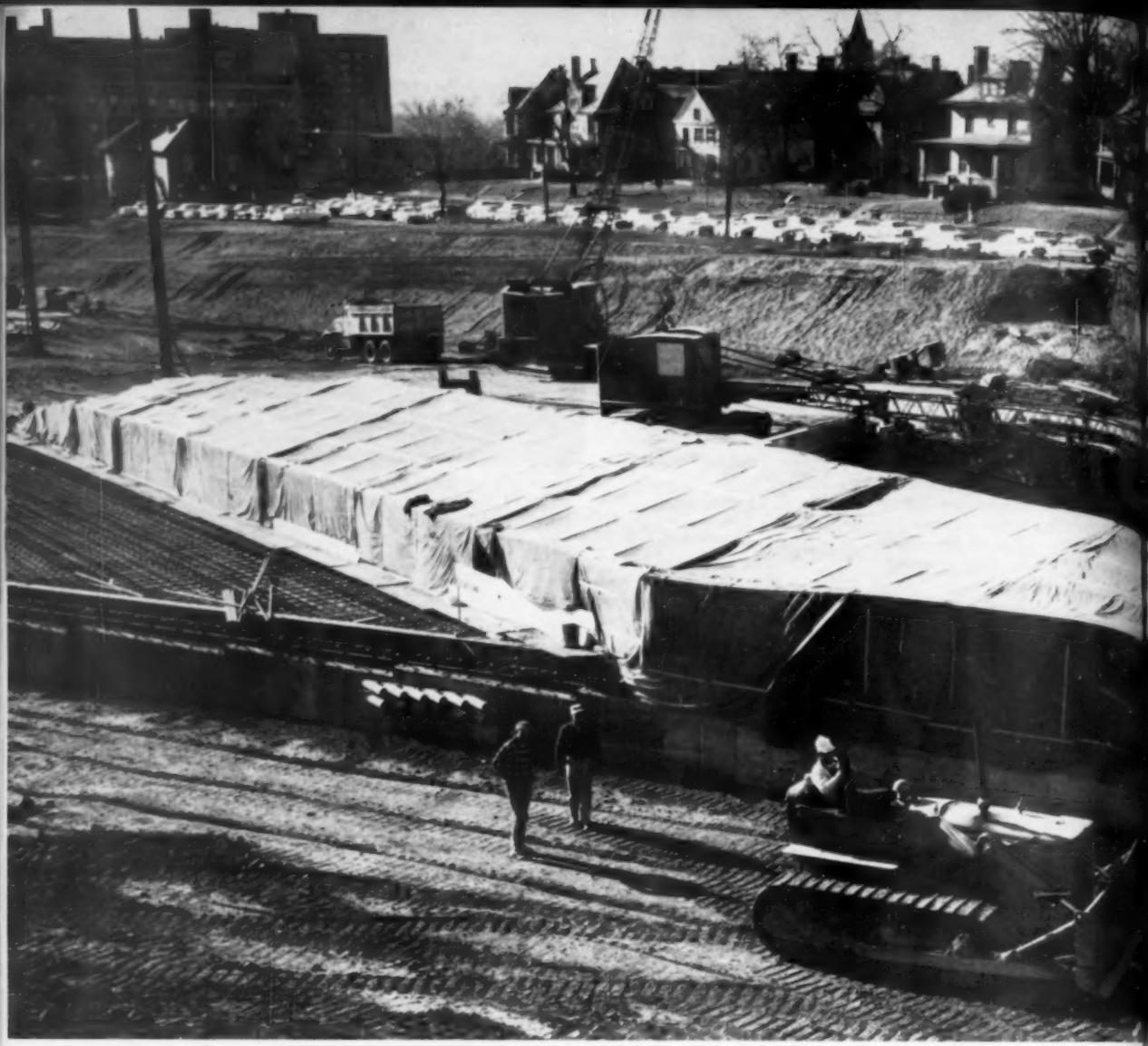
A new type of expansion joint for concrete paving is announced by B. F. Goodrich after exhaustive testing. This joint, it is stated, can absorb the movement of concrete during extreme temperature changes without any bulge, dip, or gap in the top surface, and at all times keep a tight seal against water and dirt. The joint was developed by B. F. Goodrich Industrial Products Company utilizing Du Pont Company's neoprene synthetic rubber and steel.

The joints reportedly have successfully withstood heavy automobile and truck traffic under test conditions. The neoprene resists oil, sunlight and withstands abrasion and deterioration from weather.

The joint is so designed that the movement of concrete under temperature change pushes together the neoprene cells or pulls them back to their original position like an accordian. Steel truss rods looping out from both sides anchor the joint securely to the end of each of the concrete panels. Because it is so anchored, the surface stays flush with the concrete surface.

Before installation, the joint is precompressed to the correct width by tightening the through bolts placed across the face of the joint. As soon as the concrete has sufficiently hardened, the precompression holding pin is removed releasing the pressure of the through bolt and allowing the unit freedom to contract or expand as it rides between the concrete panels. A neoprene plug is inserted to seal the hole left by removal of the through bolt. Ends of each joint are sealed, at the factory, with flexible neoprene diaphragms.

Each expansion joint unit is 13¼ in. wide and contains nine cells 5 in. high. It will accept a movement of 3 in., if movement expected is less than 3 in. fewer cells can be used per joint. One cell accounts for ⅜ in. of movement. The units in 6 and 6.5 ft. lengths can be joined end-to-end to give the total length needed.



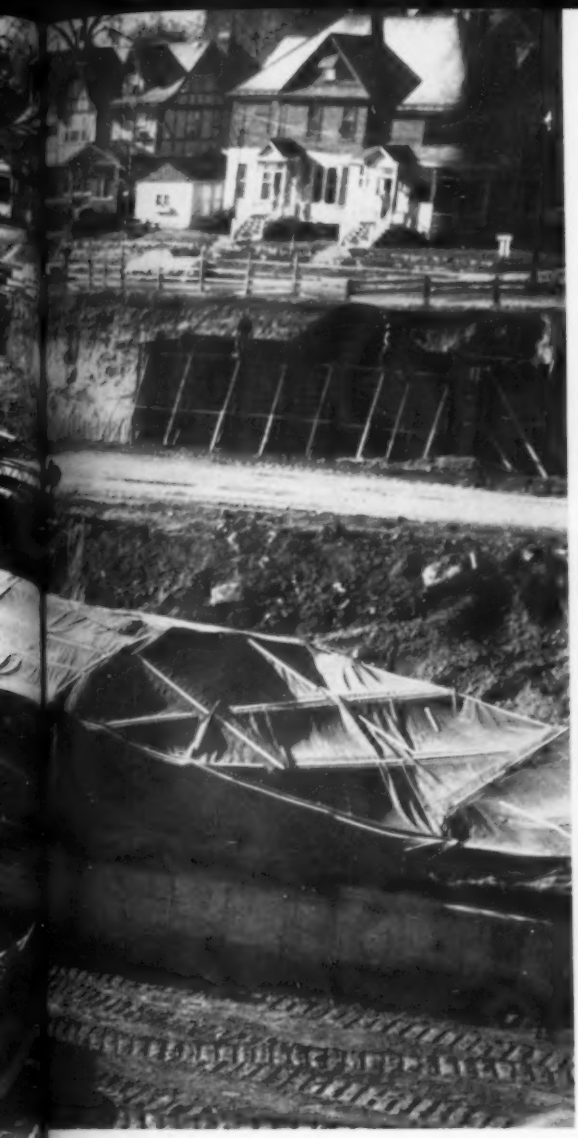
One-lane deck pour has been completed and covered over with framing and canvas. The second lane, with reinforcing in place, is glimpsed at left.

Winter Deck Pour Helps Meet Job Schedule

By James R. Cummings
Associate Editor of Roads and Streets

This example of a midwinter bridge deck pour points up the techniques used to maintain concrete temperature. When work on this Peoria, Illinois, bridge reached the paving stage, the McDougal-Hartmann Company began a telephone vigil with the weather bureau and, when the word was given, moved fast with a well laid plan.

The bridge in question is a grade separation on Interstate Route 74 one-half mile from downtown Peoria. McDougal-Hartmann's million dollar contract covered a roadway length of 1,100 ft. and included excavation and sewer work, construction of two grade separation structures, paving of the bridges and the highway between.



Placing mix for the median curb, following the flanking pavement lanes.

The paving of this deck in January was not of the contractor's choosing. The bridge carries Knoxville Avenue, a major traffic artery, over the expressway. The contract required re-opening of the street six months after closing for construction. Excavation began July 1 and expectations were for an early completion date, but a two month strike of operators and laborers during the summer halted work and upset McDougal-Hartmann's schedule. Knoxville Avenue was not closed until September 1. With the street required open again by the last of February, the company made plans for heating and protection of the deck in a cold weather paving operation.

The Knoxville Avenue grade separation in Peoria—canvas sheeting in place around the substructure. Paving of first lane almost completed—hand finishing in progress.

The bridge is a single span structure 130 ft. long and 64 ft. wide including two 24-ft. lanes, sidewalks, railing and median curb. The deck has a 63 deg. skew.

The first step was to completely enclose the substructure for purposes of confining heat. Canvas sheets were laid across framing, with special care given to overlapping, also to tucking of the canvas at corners and along the ground to be as "air-tight" as possible.

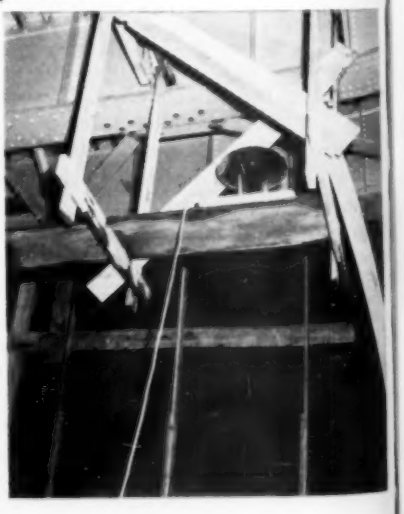
When the advance forecast received on the morning of January 6 indicated favorable weather conditions for the following day, Dave Humerickhouse, McDougal-Hartmann bridge foreman, directed the setting up of five butane-fired salamanders under the deck. Four butane cylinders were grouped under each heater—one container to be exhausted per day per heater.

The ready-mix concrete was prepared with special care. The objective was for the mix to arrive on the job at about 70 deg. temperatures. Thus the supplier, Irions Concrete Co., had to balance several factors: the length of haul, outside temperature, the cold drum, and others. Water at 90 deg. was put into the drum first, followed by aggregate, cement, and more aggregate, in that order. With a 15-minute haul through winter temperatures, it was felt that extra heat was required in the mix but precautions were taken to keep the

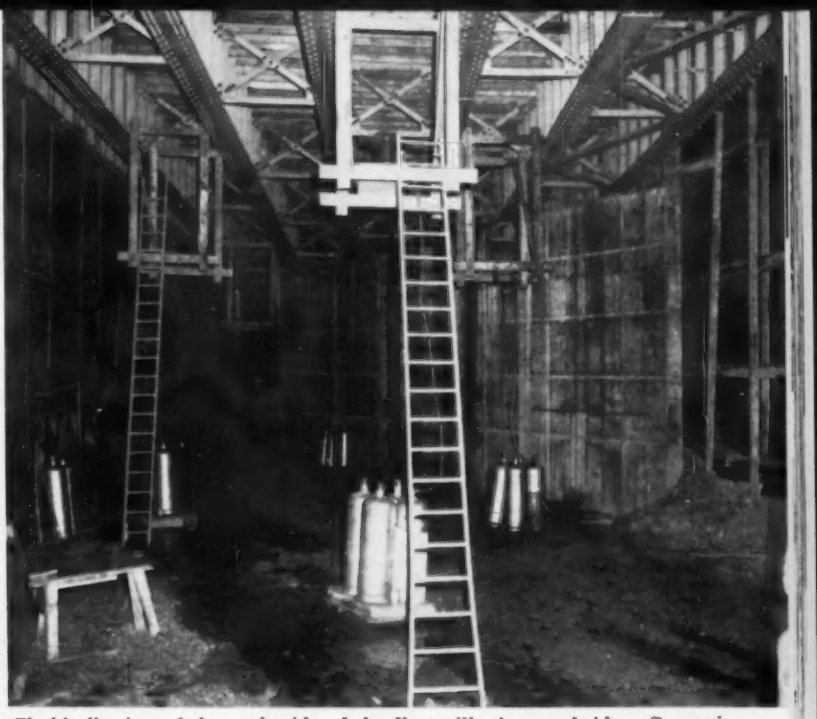
Continued on page 93

Paving of the lane completed, burlap strips being laid across the slab and immediately sprinkled down.

A close-up of one of the heaters on its platform.



Finishing of the median is accomplished with a "curb mule," put together in the McDougal-Hartmann shop. The man in the foreground hugs the device close to the form. The "mule" is pulled along by a hand winch.



Flashbulb view of the underside of the Knoxville Avenue bridge. Protective canvas enclosures, seen at right and left. Salamanders are shown rigged up beneath the deck with the gas cylinders clustered beneath them.

The crane prepares to bring in the roof framing.

WINTER DECK POUR

Continued from page 88

water temperature under control so as to avoid any chance of flash setting. The aggregate was steam heated to about 70 deg. to minimize contrast of temperatures in the mix which would inhibit proper setting and curing. Darex air entrainment agent was used.

Paving was to take place if the temperature was "25 degrees and rising." The advance forecast of good weather proved correct, and McDougal-Hartmann got a clear day and one in which the thermometer finally reached 40 degrees. The first trucks, with 5½-yd. Rex mixers, began arriving shortly after 8 a.m. The mix was placed from 1-yd. buckets by Koehring 304 and 405 cranes, and finished by a Clary roller-type screed and the conventional longitudinal floats and straightedges. The median curb was placed through a contractor-built "mule" pulled by a hand winch.

Seventy-five cubic yards of concrete was laid by 11:30 a.m. Only one of the two lanes was paved that day, with the other scheduled for paving seven days later, weather permitting.

The final step in weather protection followed immediately upon the surfacing of the deck. A number of timber trusses which had been assembled in the McDougal-Hartmann carpenter shop were brought to the site prior to the day of pouring. Burlap was laid across the freshly set concrete and wetted, then the crew carried these trusses to the deck and raised them in vertical position, spaced every 8 or 10 ft. A crane then placed on the trusses a "roof" framing to which canvas sheets were secured.

The heaters, burlap, and the substructure and topside housing remained for the 7-day curing period. During this time the heat was tapered off toward the last at a rate of 15 deg. every 12 hours. The entire process described here was then repeated for the other lane.

R. D. McDougal and H. W. Hartmann are the contracting company's owners. V. O. Hart is general superintendent and Jack Tomlinson bridge engineer.

ENGINEERS ESTIMATE

Continued from page 59

duction delays due to congested traffic, higher labor, material and equipment costs.

At the next stage of development the Cost Engineer will probably hit upon unit bid prices from his own or similar projects as the solution of his problem. It seems that the logical thing to do is to average the unit bid prices for one project and be thereby prepared for the next project.

A refinement of such a method will be the passing from simple average bid prices to weighted average bid prices, and later on, an "analysis" of the bid prices by electronic computer. But at this stage the Engineer should recall that no matter how impressively the lights flash, the buzzers buzz and the electrons dance, what comes out of the machine is precisely as accurate as what goes into it.

What goes into it is often inaccurate for a dozen reasons. When contract awards are made on the basis of total bids—which is the usual way—bidders can and usually do, vary individual unit prices to suit their fancy and convenience. The absurdity of the entire proceeding however, can be centered in this—the Cost Engineer goes to the bidders for the data to check their own bids. The bids might just as well be accepted at their face value, without control, at a saving in time and money.

Costs based on any data previously discussed may produce estimates, but not engineers' estimates. The last half of the title "Cost Engineer" should be just as important as the first half.

It is assumed that the Cost Engineer has sufficient design and construction experience to understand the problems involved in building a given project.

His design experience will enable him to understand the plans and specifications, and his construction experience will help him to visualize the actual scheduling of operations and their relative difficulty.

It is likewise assumed that he has available the labor rates, both pay and production, from several of his own projects.

With such field report data, it will be possible to establish usable average production rates for the various units of construction or payment items. These are recurring items based on constant units such as ton, cubic yard, pound or lineal foot.

Starting with these manhour per unit figures, the Cost Engineer can then develop his own cost estimating method, adaptable and fast, yet accurate enough for control purposes. If ratios are used in place of extended computations, much time can be saved and flexibility maintained.

There are in any construction project just three elements—labor, material and service. The latter includes all costs not obviously chargeable to labor or material. In recurring projects, it is usually possible to equate all labor rates on a project ratiowise to one rate—for instance common labor.

Service costs include equipment costs, general and project overhead, and profit. In recurring projects, it will be found that the total of such items usually bears a constant ratio to the total labor costs for each particular type of project.

The service cost ratio can then be combined with the average labor rate to obtain a single labor-service factor applicable to each type of project, and for a given locality, that will be usable for a year or more.

By multiplying the manhours per unit from the construction reports by the common labor rate and this labor-service factor, the labor and service cost of the unit item is quickly obtained. The material quotation per unit is then added to get the total unit cost.

Although the manhours per unit and the service factor for each type of project may take considerable time to compute for the first projects, they change slowly and may need only annual renewal.

Material costs are the most difficult to pinpoint and the Cost Engineer should be reminded again that the price of a thing is what someone will pay for it. It is in this area that the laws of supply and demand get full play. No further contingency allowance is usually needed in any cost estimate than the one that is automatically contained in the list price material quotations. He who comes with definite order in hand can expect a lower price than the one who seeks merely a control quotation.

By evaluating his own estimating method on the basis of substantiated accuracy, which is the engineering way, the Cost Engineer will be better prepared to evaluate the accuracy and validity of his final project costs.

Durability of Concrete Vs. Aggregate Freezing

Durability of concretes made with different aggregates depends upon the rate at which these aggregates become critically saturated in the concrete and the physical response of these aggregates to freezing.

So reported George Verbeck and Robert Landgren, Portland Cement Association, in a paper at the 1960 ASTM convention at Atlantic City. The authors pointed out in their paper "Influence of Physical Characteristics of aggregates on Durability of Concrete," that the mechanism of saturation of aggregates is considered in terms of their physical characteristics and the characteristics of the mortar protecting the aggregates from water.

Effects on concrete durability of freezing various saturated aggregates was believed to depend upon the pore characteristics of the aggregate and the rate of freezing of the concrete.

Glenway Maxon, consulting engineer, in his paper, "Testing Performance of Stationary Concrete Mixers," and I. Narrow, Corps of Engineers, in his paper, "Performance Tests of Field Concrete Mixers," described many of the methods in use for sampling plastic concrete in stationary mixers to evaluate mixer performance. A list of suitable tests for evaluating mixer performance was suggested. Both speakers maintained that testing of mixer performance is practical and desirable.

'Better Highways' Foundation Swings into Action

Funds flowing in as new agency begins working with local outlets on unprecedented good roads program

One of the busiest places in Washington right now is 2000 K Street, NW. This is the headquarters of the Better Highways Information Foundation, the agency created, by the roadbuilding industry to interpret highway needs to the public and to the Congress.

This new organization set up early in the present year is now rolling. And this month it is very much in the news.

Where does this important development stand today? Here are the highlights:

Firstly, the Foundation is not under any one association but is a completely independent organization. Its major supporters are the American Road Builders Association, the Associated General Contractors of America, Associated Equipment Distributors, and Construction Industry Manufacturers Association. This joint backing means that—*for the first time*—the highway cause has a truly industry-wide voice.

Contractors, equipment manufacturers and distributors, material and supply industries, as well as innumerable individuals and local groups concerned about highway needs, now have an effective instrument for unified action.

The Foundation is presently operating under an Executive Committee consisting of H. D. Anderson, former president of the Associated Equipment Distributors; M. C. Harrison, president of Harrison Construction Co., of Pittsburgh; Kenneth Lindsay, executive vice-president, Iowa Manufacturing Co.; M. C. Miller, president of San Ore Construction Company, of Kansas; John Radomsky, construction marketing chief, Caterpillar Tractor Co.; and Nello L. Teer, Jr., North Carolina contractor.

Secondly, funds are rolling in, and adequate financing is in sight to do the job the Foundation has mapped for itself. Quotas have been fully met in 17 states at this writing, with the list growing rapidly.

Thirdly, the Foundation has a soundly conceived purpose in the public interest, and has shown assuring signs that it is capable of the bold and imaginative effort needed to make a public information program resultful.

A public relations advisory committee has developed a detailed program for the next twelve months for creating, producing and disseminating material to the press, radio, television and other communications media. A plan has also been devised for organization of state groups to implement the public information program. State field directors are already appointed in many states and others are to be named soon.

Continued on page 98

Correction!

Editor's Note: September Roads and Streets, on page 177, announced George M. Foster's appointment as executive-director of the Better Highways Information Foundation.

As many readers know from current industry reading, Mr. Foster did take this position briefly but resigned during the summer. This out-dated news item, from an old printer's galley, got on the press while some of the Roads and Streets staff was on vacation.

We regret this slip-up, and offer apologies to all concerned. The accompanying progress report on the Foundation should set everyone straight.

The TS-14

Excellent maneuverability and all-wheel drive make the TS-14 an ideal machine for land clearing, grading plant sites, etc. Self-loading sand and clay at this housing development, the "Twin" handled clearing and grading work for streets and home sites.

Low, wide bowl and 4-section cutting edge speed loading in any scraper material . . . blade sections are adjustable, reversible and identical. Ability to work without pusher assistance makes this "Twin" an efficient scraper for stripping jobs in sand and gravel operations, mines, and quarries.

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FOR MOVING EARTH, ROCK, COAL AND ORE

all-wheel drive "EUC" is a one man spread!

another Euclid engineering advancement . . .
"Twin" puts more profit in every payload!

Here's performance and work-ability in a 14 yd. scraper . . . 20 yds. heaped . . . that's way ahead of any machine of comparable size. With two engines and separate Torqmatic Drives for each axle, the TS-14 provides all of the cost cutting advantages of all-wheel drive in a medium size scraper.

This new "Twin" self loads in practically any material and with a pusher for loading it's a big producer on even the toughest jobs. There's plenty of power and traction to get a heaped load in a hurry . . . to get out of the cut or borrow pit fast . . . and to really highball on the haul road. The TS-14 does a wide range of work, with or without a pusher, and is the most versatile scraper in its class.

Steep grades and adverse conditions that slow down or stall other scrapers are routine for the "Twin" . . . it can work more days per season and give you a bidding advantage on that next job or cut earthmoving costs on your present work. Get the performance facts from your Euclid dealer or write for the new catalog No. 555.

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BETTER HIGHWAYS

Continued from page 95

Kits of material have been sent in recent weeks from the Foundation's Washington headquarters to its growing list of grass-roots outlets. This is the beginning of a conveyor belt operation that can transmit a flood of such material to the public.

A public relations director and a field coordinator are being added to the headquarters staff, and a major public relations firm appointed, to swing the program into high gear.

The need for such an understanding is well known. Congress in its last two sessions has given highway matters only the most cursory attention. Congressmen individually were aware of the inadequacies of financing that had h o b b l e d the Interstate program, but were unable to come to grips with the problem.

The reason for this was clear: There was little expression from an aroused public to force the issue. The lack of this public support was never more painfully in evidence than in the past year, even before rumors of the highway scandals that subsequently broke out in Oklahoma, Florida, Massachusetts and some other states. The *Readers Digest* article and other inflamatory and distorted articles only served to remind everyone further that 1961 would be a critical year for the highway program.

The 1961 Congress must take up highway financing at a time when many of the organizations that ordinarily would unite in their supporting position are split, poles apart, over various financing proposals. Also, this Congress will receive long-awaited reports on the findings of the AASHO road test and the highway cost allocation study. Both reports are bound to stir controversy.

Looming ahead, then, is a battle between huge, powerful lobbying interests—the petroleum industry, the automotive manufacturers, the highway user segments, and other groups. This can create an atmosphere in which the country's basic need—the need for a long-range, continuing, adequate, b a l a n c e d program of highway building—may

Spearheading Foundation's

Listed are 31 states where representatives of the industry will be raising funds this month to support the national program of the Better Highways Information Foundation. Some are close to meeting their quotas, but all need your help to put them over the top.

No one has a more direct interest in the future of the highway program than the readers of this magazine. If you are a contractor, a materials producer, a consulting engineer, or an equipment distributor, we hope you will feel impressed to help shoulder the load in this most worthwhile undertaking.

Alabama E. N. Rodgers, Alabama Road Builders Association, 215 Bell Building, Montgomery 4.

Arizona James R. McDonald, Arizona Chapter, AGC, 302 Luhrs Building, Phoenix.

Arkansas Ben M. Hogan, Ben M. Hogan & Company, P. O. Box 2860, Little Rock.

California (Northern) George C. Loorz, Stolte Inc., 8451 San Leandro Street, Oakland 21.

California (Southern) Walter F. Maxwell, W. F. Maxwell Company, P. O. Box 356, 10641 Mulberry Avenue, Fontana.

Colorado R. W. Blanchard, Colorado Contractors Association, Inc., Blanchard Construction Company, P. O. Box 268, Derby.

Connecticut E. B. Burdick, Connecticut Road Builders Association, 530 Silas Dean Highway, Withersfield.

Delaware Richard M. Appleby, Sr., George & Lynch Company, M210 Delaware Trust Building, Wilmington.

D. C. Andrew Johnson, D. C. Road Builders Association, 817 Bunker Hill Road, N.E., Washington 17.

Florida Sam P. Turnbull, Florida Road Builders Association, P. O. Box 1208 (Cherokee Hotel) Tallahassee.

Georgia Paul L. Andrews, Georgia Highway Contractors Association, 603 Forsyth Building, Atlanta 3.

Idaho L. C. Goddard, AGC of Illinois, 204 First National Bank Building, Springfield.

(or)

Taylor G. Soper, Illinois Road Builders Association, 228 North LaSalle Street, Chicago 1.

Indiana W. M. Holland, Indiana Highway Constructors, 801 Roosevelt Building, Indianapolis 4.

Iowa George A. Lowe, Associated General Contractors of Iowa, Lowe Construction Company, P. O. Box 25, Marion.

Kansas M. Clare Miller, Associated General Contractors of America Inc., San Ore Construction Company, Inc., Box 417, McPherson.

Kentucky W. O. Snyder, Kentucky Road Builders Association, New Capital Hotel, Mezzanine Floor, Frankfort.

Louisiana Thomas Folk, T. L. James and Company, Inc., Box 531, Ruston.

Maine Norman A. Burkitt, N. A. Burkitt, Inc., P. O. Box 2146, South Portland.

Maryland William E. Hardy, Maryland Highway Contractors Association, 1123 N. Eutaw Street, Baltimore 1.

Massachusetts Gordon E. Gaffney, New England Road Builders Association, 20 Kilby Street, Seventh Floor, Boston 9.

Michigan C. J. Carroll, Michigan Road Builders Association, P. O. Box 96, 611 W. Allegan Street, Lansing 1.

Fund Raising Program

Minnesota Abe H. Johnson, Johnson Construction Company, 5301 U. S. Highway 169, Minneapolis 24.

Mississippi R. A. Harris, Mississippi Road Builders Association, 3D Robert E. Lee Hotel, Jackson.

Missouri Paul I. Byrne, Associated General Contractors of Missouri, Suite One, Hotel Governor, P. O. Box 94, Jefferson City.

Montana L. M. Sheridan, F & S Contracting Company, P. O. Box 4, Butte.

Nebraska C. R. Cooper, Nebraska Chapter—AGC, Cooper Construction Company, 110 South 46th Street, Omaha.

Nevada E. F. Duerr, Isbell Construction Company, Inc., South Virginia Road, Box 2351, Reno.

New Hampshire J. C. O'Shea, N. H. Tractor Corp., 274 North State Street, Concord.

New Jersey Clifford F. Chapman, J. F. Chapman & Son, Inc., 1303 North Broad Street, Hillside.

New Mexico R. E. Miller, Associated General Contractors of New Mexico, P. O. Box 1693, Santa Fe.

New York Thomas G. Carroll, Jr., New York Good Roads Association, 116 Washington Avenue, Albany 1.

North Carolina S. C. Austin, Associated General Contractors of America Inc., Carolinas Branch, AGC, Suite 222, Builders Building, Charlotte 1.

North Dakota Tom C. Sornsin, Associated General Contractors of North Dakota, Sornsin Construction Company, Box 1566, Fargo.

Ohio Karl Rothermund, Jr., Ohio Contractors Association, 40 West Gay Street, Room 200, Columbus 15.

Oklahoma W. D. Amis, Amis Construction Company, 1647 Exchange Avenue, Box 1871, Oklahoma City.

Oregon A. H. Harding, Associated General Contractors of America, Inc., 129 S. W. 3rd Avenue, Multnomah Hotel, Portland 4.

Rhode Island Gordon Gaffney, New England Road Builders Assn., 20 Kilby Street, Boston 9.

Pennsylvania W. Guy Gunn, Pennsylvania Highway Information Association, 600 N. Third Street, Harrisburg.

South Carolina Ray F. Long, Ray Long Equipment Co., 820 Blossom Street, Columbia.

South Dakota L. R. Jerry Hobart, South Dakota Better Road Information Association, P. O. Box 1217, Huron.

Tennessee Leslie T. Hart, Tennessee Road Builders Association, Hermitage Hotel, Nashville 3.

Texas James M. Richards, AGC Texas Highway-Heavy Branch, Driskill Hotel, Austin.

Utah Paul A. Thorn, Thorn Construction Company, Inc., Box 111, Springville.

Vermont Gordon Johnson, State Equipment Co., Box 394, Montpelier.

Virginia Frank A. Howard, Virginia Road Builders Association, King Carter Hotel, Richmond 19.

Washington Alton V. Phillips, Alton V. Phillips Company, 4055 21st Avenue West, Seattle.

West Virginia William T. Brice, West Virginia Contractors Association, Mezzanine Floor, Ruffner Hotel, Charleston.

Wisconsin E. E. Hoebel, Wisconsin Road Builders Association, 1 West Main Street, Madison 3.

Wyoming Charles M. Smith, Box 508, Thermopolis.

be easily overlooked.

It was under this already threatening cloud that the ARBA's original Public Information Advisory Committee went to work last year. Under Donald Buttenheim, publisher and president of CIMA, the Committee drafted a policy which is today the guiding blueprint of the present Broadened Foundation.

The Committee also fathered the slogan that is still the banner cry: "Better Highways Now! Save Lives, Save Time, Save Money."

Paul Reinhold, of Atlas Equipment Corporation, Pittsburgh, and past-president of ARBA, headed a committee for a time which devised a fund raising program. The revamping of the original committee into the present industry-wide Foundation followed.

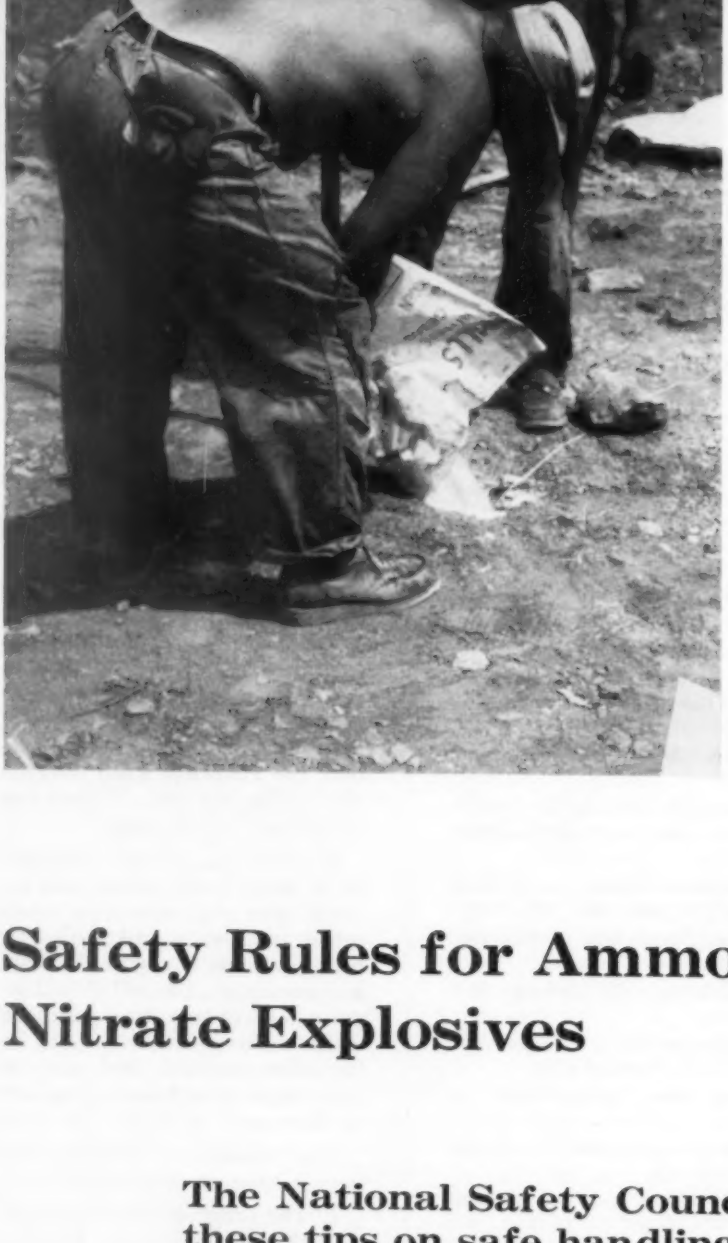
In some cases the Foundation will work through existing organizations that have proved effective: the Iowa Good Roads and Association, the Tennessee Road Builders Association, the Ohio Contractors Association, for example.

In other states a start will have to be made from scratch and entirely new organizations established and groups linked in that heretofore have not figured in highway promotion. The BHIF field coordinator will help these groups to utilize the nationally-originated information material and also to create material and devise programs of their own.

The Foundation's leaders at this stage emphasize two points:

1. The program must be implemented at the local level. The goal of the whole endeavor is to re-kindle grass-roots support for better highways, so that people back home will write their Congressmen by the mailbag-ful and local newspaper clippings will be full of the need for highways and for Washington action.

2. More funds are needed. The Foundation needs the support of many organizations and individuals that are waiting on the sidelines. These groups would be wise to come aboard. And contractors and industry suppliers through their respective associations are being urged to support the Foundation with contributions.



Ammonium nitrate prills being poured into a 3½-in. blast hole on a Pennsylvania highway project. (Roads and Streets staff photo.)

Safety Rules for Ammonium Nitrate Explosives

The National Safety Council passes on these tips on safe handling of this popular explosive type

There are many "do's" and "don'ts" in the safe use of a type of explosive that is often regarded as safer than others, i.e., ammonium nitrate fertilizer compounded explosive. Contractors who have occasion to use this explosive may want to pass on the following rules and suggestions to their foremen and crews. Condensed from a recent Construction Newsletter of the National Safety Council, the following notes cover the main essentials of a directive on the subject issued by the Portland, Oregon, office of the Corps of Engineers.

Any warehouse or other structure used to store ammonium nitrate must be protected from moisture and roofs or walls above the masonry must be of light weight type construction. The heat should come from a source outside the storage building. Electrical systems in the building are required to conform to the National Electrical Code. Ammonium nitrate could flow in drains if it became molten during a fire, which makes a plug or turn-off necessary on all drains for that purpose.

Floors should be of concrete or other material that will provide a clean, dry and fireproof surface. Good housekeeping rules are to be observed at all times.

If the ammonium nitrate is to be stored in bags, the law requires the

Continued on page 103

AMMONIUM EXPLOSIVES

Continued from page 100

bags to be no closer than 30 in. from the storage building wall, and bags should be piled not more than 12 ft. in width, leaving a minimum of 36 in. aisle space.

Bags must not be stacked to a height closer than 36 in. from the ceiling or supporting eaves. A 3 ft. space should be allowed between the stored chemicals and any radiator or other heating device. To insure cleanliness and dryness, the bags must be stored on wooden pallets.

Any other explosive is banned from storage in the same building with ammonium nitrate; this bag includes electric caps. Organic chemicals as well as flammable liquids are likewise banned from the same building. Smoking or open flames are forbidden.

If a material is spilled the law requires that it be quickly cleaned up and removed. Broken or contaminated bags are also to be removed as soon as they are discovered. In certain cases where a bag is broken and the material within is not damaged the remaining material may be rebagged or placed in a slip-over bag.

Mixing of the chemicals must be done in a separate building and the standards are the same and as strict as those set down for the storage rooms. Cleanliness is, here again, to be observed. Unmixed material should be returned to the original place of storage. Empty bags and other like material must be destroyed as the law prescribes. Corrosive action is prevented by the requirement that the floors be sprinkled with slacked lime and hosed down a proper drain. The law makes the same requirements of the mixing building as it does the storage building in regards to lighting, flames and heat. Metal tools should be of the non-sparking variety.

Oily waste and rags are required to be stored in covered metal containers. Any spillage is to be cleaned up and removed immediately.

Because only large volumes of water will extinguish an ammonium nitrate fire, a fire hydrant is required to be in both the storage and mixing building to provide against fire hazard.

If the compounding is done at the hole, the same precautions are to be taken as previously described for buildings.

There are a number of carbonaceous materials which can be added to ammonium nitrate as sensitizers. For field mixes only, No. 2 diesel fuel oil, which has a flash temperature of 145 deg. F, may be used. Other fuel oils and powders are considered very dangerous and should be avoided.

As a warning, some grades of ammonium nitrate will absorb as much as 9 percent fuel oil which would result in incomplete detonation. Excess oil acts as a heat sink and will rapidly absorb some of the energy available on detonation. Any incomplete detonation means more toxic gas products, which are harmful to anybody in the area.

Mixing should be by manufacturer's specifications. These specifications are: add ½ gal. of No. 2 fuel oil to the top of an 80 lb. bag of ammonium nitrate and allow the bag to stand for at least 30 minutes before loading into the hole. Two or three small knife holes in the bottom of each bag will allow the excess oil to drain out.

The law requires that field compounded nitrate must not be stored. Therefore only the amount necessary for one day's work should be mixed.

Disposal of the unused explosive is to be done by burying it in a remote location. The material should be spread in piles of about 2 in. and ignited by a combustible train or electric or non-electric squibs. It may, however, be dissolved in water and emptied into a pit, or it may be spread over the surface of the ground and covered by plowing it under. It can at no time be dumped into lakes or streams.

Ammonium nitrate fertilizer compound is classified by the U. S. Bureau of Mines as non-permissible. Bulk $NH_4 NO_3$ is sold only for non-permissible uses, and is not to be used in closed areas such as mines, shafts or tunnels.

Labor

By Jack James

States Allow Time Off to Vote

Twenty-eight states permit employees to take time off to vote, according to a new pamphlet published by the U.S. Department of Labor. Seventeen of these states prohibit pay deductions; 13 states specify that employees must apply in advance for time off to vote; and some states let the employers set the time.

With elections up-coming in November, you might want to know what your state law is. For a free copy of the pamphlet, "Time Off for Voting Under State Laws," write the Bureau of Labor Standards, U.S. Department of Labor, Washington 25, D.C.

Labor Board Backs Association Bargaining

Members of an employer association have the right to stick together in bargaining, even though a union wants to bargain individually, the National Labor Relations Board asserts.

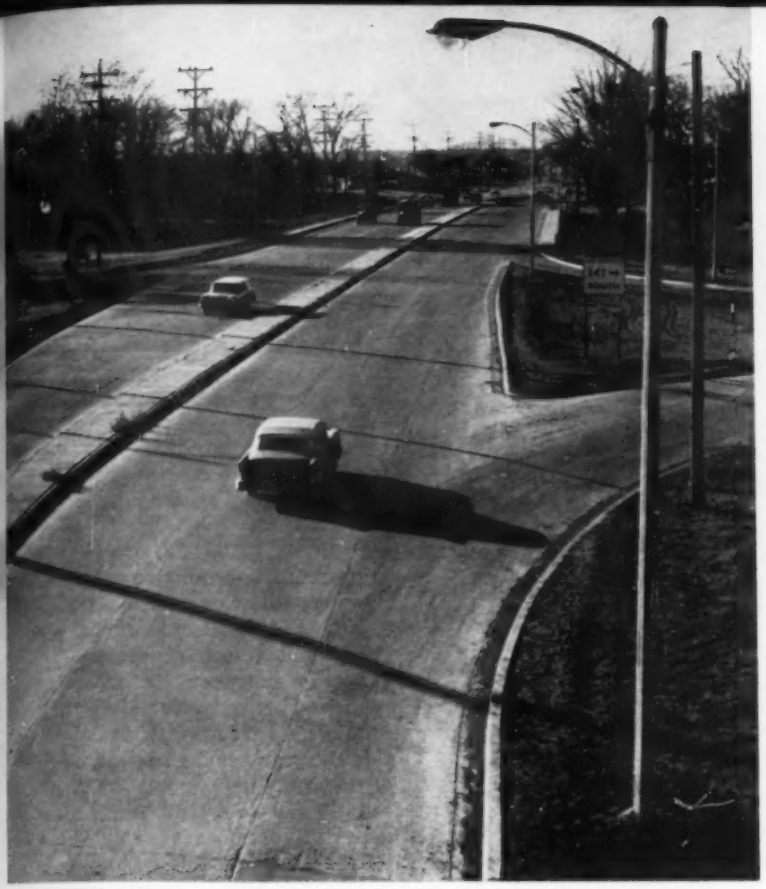
An Association (not named by the Board) had a history of bargaining with a union (also not named). During recent negotiations, the union struck several members of the Association. The union disbanded its bargaining committee, and announced that it would not deal with the Association, only with member companies.

The companies, however, refused to deal with the union except through the Association. The union charged that the companies were refusing to bargain. The Labor Board said that actually if anyone were refusing to bargain, it was the union.

Road Lighting Contractor Wins Race with Winter

By L. W. Aldridge
Aldridge Electric Co., Milwaukee, Wis.

←
Setting American Stress Spun concrete pole, completely wired on the ground before lifting into augered hole.



Port Washington Road showing completed lighting installation.

Wiring pole from conductor laid in open trench.

Aligning pole with plumb bob during installation.

The seasonal nature of street and highway lighting construction in the four state area in which Aldridge Electric Co. operates results in our treating it as an operation separate from our commercial and industrial work. In common with most contractors in the northern states, we employ local help on those jobs whenever possible. As these jobs come at a time of shortest labor supply, we find it double advantageous to study and streamline construction practices. Materials, too, when we have the option.

The specifications of the Wisconsin highway commission for lighting Milwaukee's Port Washington Road gave the bidder the choice of installing aluminum standards on separate poured concrete bases, or stress-spun concrete standards having the butts cast as part of the pole at the factory. Selecting this latter type of construction, together with a sound and practically engineered electrical system, enabled us to make the low bid of $155,061.50 for the 290 luminaires, 281 standards and three substations.

The electrical system designed by the highway commission engineers called for a 480-volt circuit with bare grounded neutral conductor. Their design of substations using pad-mounted transformers also made substantial reductions possible.

Savings in the installation began when representatives of the American Concrete Corporation (manufacturer of the poles) had their trucker spot the standards at final locations in order to avoid handling. As shown, the poles were wired on the ground before the brackets were attached. Luminaires and lamps also were installed on the ground to make ladder work almost unnecessary.

The holes were augered in while the wiring was in progress, and the same truck with boom attached was used to pick up the wired assembly in a vertical position and spot it in the hole just prepared.

As the hole was backfilled, a hand line attached about 12 ft. from the ground line was used to plumb the pole. Sighting-in was done with a plumb line held at arm's length as shown in the illustration. Most of the trenching for the underground conductors was done by machine after the poles were set. The short laterals were dug by hand as the main trenching progressed.

While this outline of construction is overly simplified, we believe the project represents a new high in overall efficiency. The system design by the state highway engineers sacrificed nothing of quality in their effort to make this job a bench mark for the future. The manufacturer of the standards coordinated delivery to the job site with our schedule to enable us to complete the contract on time, and before winter weather set in.

Quick Facts on Wisconsin Highway Lighting Installations

Project	Port Washington Road near Milwaukee, Wis.—dual 35-foot-wide concrete roadways, 3 miles long, separated by a median varying from 4 to 24 ft.
Luminaires	Mercury vapor with self-contained ballast having 480-volt constant wattage. 400-watt on highway, 250-watt on interchanges.
Standards	American Concrete Stress-Spun. Precast butt set back 4 to 12 ft. from face of curb. Natural cement finish. Quantity 290. Mounting height 30 ft.
Brackets	4 to 12 ft. long.
Spacing	95 to 120 ft. on highway—staggered. 65 to 90 ft. on inside of ramps. Luminaires mounted over curb. Poles located on inside of ramp curves.
Illumination	Maintained level of illumination varies from 0.6 to 0.9 footcandles.
Power Supply	Primary energy purchased at four locations at 4,800 or 2,200 volts. Pad mounted transformers belonging to state highway commission furnish secondary power at 480 volts.

The low installed unit cost of $550 per standard with luminaire for the completed system tells more adequately than words the benefits that can accrue to the motoring public. We believe the need for highway lighting safety is growing in recognition and are satisfied to have had a part in pointing the way toward its greater use.

ASTM Committee Lists Soils Problems

Recent emphasis on the basic science of materials, evidenced by the formation of the new ASTM Division of Materials Sciences is being felt in Committee D-18 on Soils for Engineering Purposes. The committee has been research-minded since its origin; at that time standard methods of test of soils was a virgin field. At the meeting of the Committee held last June during the Annual Meeting of the American Society for Testing Materials at Atlantic City, the Research Steering Subcommittee under the direction of Prof. W. S. Housel listed 25 problems on the program of the Committee. Such fundamental matters as the physical-chemical properties and the dynamic characteristics of soils are included in this list.

In the field of soil investigations and sampling the responsible subcommittee is taking advantages of work accomplished by other organizations, such as the Canadian Standards Association, which has prepared a method of performing cone penetration tests, and the U. S. Bureau of Reclamation, which has perfected a method for vane shear testing of soils. These two methods are being reviewed by the subcommittee for possible incorporation into existing ASTM standards or as new standards.

Methods of test for determination of maximum and minimum density of granular soils are being developed. Capillarity and permeability of soils are being given attention, with a research project established to secure the necessary technical data for a method of test.

The well-known California Bearing Ratio method of test for soils will now be recognized as an ASTM standard, following action taken by the Committee in approving a proposed method for letter ballot. In this same field a proposed method of test for density of soil in place by the rubber balloon method was also approved, subject to letter ballot.

Renewed activity was noted for bearing test of soil-in-place. Several items were discussed for future study relating to plate loading tests. In the area of pile load bearing tests a proposed method for the load capacity of batter pile frames, submitted originally by the U. S. Bureau of Yards and Docks, was approved in subcommittee and will be referred to Committee D-18, following additional minor changes. Additional research problems relating to pile tests include stress conditioning and pile deformation under load, load distribution in side shear and point bearing, stress distribution in the soil mass surrounding a pile, and bearing capacity and action piles under shock loading.

The Committee is planning a symposium on the dynamic properties of soils as well as a general soils session for the 1961 Annual Meeting.

Tribute was paid to retiring chairman E. J. Kilcawley, who has served in that capacity since 1944. Recognition was also given to the work of First vice-chairman, William S. Housel, and second vice-chairman, Fred J. Converse, who are retiring from these offices. W. G. Holtz, U. S. Bureau of Reclamation, Secretary since 1950, was elected chairman. A. A. Wagner, Bureau of Reclamation, formerly assistant secretary, became secretary. John P. Gnaedinger, Soil Testing Services, Inc., was elected membership secretary.

Soil-Cement Shoulders

A new motion picture describing the use of soil-cement pavement in construction of highway shoulders has been released by the Portland Cement Association.

The film is available on loan from the Portland Cement Association, 33 West Grand Avenue, Chicago 10, Illinois, or through the Association's 34 district offices.

Big chunks of concrete from building demolition, waiting reduction. Primary crushing unit is a Cedarapids 2036 jaw.

Concrete Crushed for Base

When an urban freeway job entails getting rid of a huge quantity of foundation and floor concrete from building demolition, the disposal cost can be high. This is particularly true if, as in the case of a Los Angeles project, the haul would be long and a dumping site hard to find or costly to purchase.

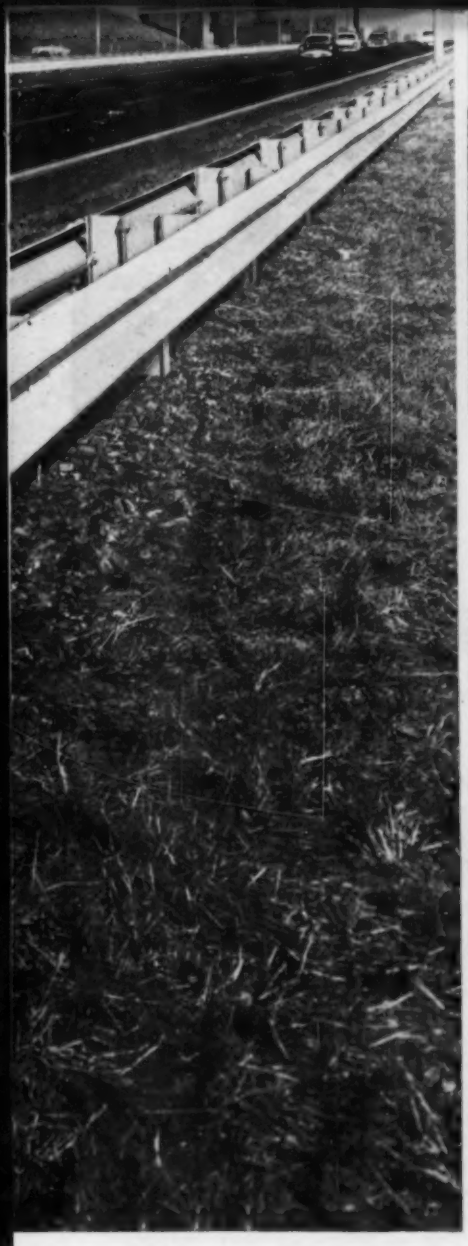
This Los Angeles contractor, Griffith Company, took the position, "Why haul it away? Why not crush the stuff and use it for base aggregate?"

Which is exactly what the company did under a change in procedure. A plant was set up on the project consisting of a Cedarapids 2036 jaw crusher with 30" x 10' pan feeder, powered by a Cat diesel unit. A secondary unit was necessary; this consisted of a Pioneer 2040 double roll crusher with symons bar screen and under crusher conveyor. A Pioneer 30-in. belt conveyor stockpiled while a Cat 977 loader fed the primary and a Cat D8 performed cleanup work. A GM Detroit Diesel twin 6-71 diesel generator supplies current for the units other than the 2036 jaw.

Concrete stone stockpiled from the crushing of old concrete—cheaper for this contractor than hauling the refuse through the city to a purchased dump site. Pioneer double roll unit for secondary crushing, seen in foreground.

How to avoid a collision course Head-on collisions on our highways have become a national tragedy. To save hapless drivers from steering a collision course on the New Jersey Turnpike, the Turnpike Authority has erected some USS AmBridge Highway Beam Guard Rails and Posts along this heavily traveled route. ☐ Sturdy steel barriers, two feet high, will be centered along the grass strips which divide the turnpike's traffic lanes. The barrier rails are made

This mark tells you a product is made of modern, dependable Steel.



USS AmBridge Sectional Plate is perfect for drainage structures or underground passageways. It won't crack, won't break. It's easy to install because there's no need for forms. AmBridge Sectional Plate comes in a complete range of sizes.

USS AmBridge I-Beam-Lok is a sturdy, lightweight bridge flooring. It installs quickly and easily with few interruptions. The filled type is available in units 6' wide and up to 49' long that apply directly to stringers on spans from 6' up to 8' centers. The open type is also available for spans up to 4' centers.

of 10-gage steel plate bolted to spacers on 6″ WF, 8½-lb. steel posts 5′9″ long. These barriers are rugged. They'll put an effective stop to cars skidding across the grass into oncoming traffic. ☐ USS AmBridge Steel Beam Guard Rail is highly visible. It bolts easily but firmly to steel posts and is available in 12′6″ and 25′ lengths to minimize splicing. Write or contact any one of our offices for literature and information on American Bridge Highway Products.

USS, AmBridge and I-Beam-Lok are registered trademarks

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American Bridge Division of United States Steel

. . . for more details circle 344 on enclosed return postal card

Bailing out an abandoned coal mine pit in the path of an interchange ramp. Problem: to spoil this material "with a purpose."

"Central Penn's" Grading Equipment

Excavators: 2 Marion M-111 4½-yd. with Esco hard-rock buckets; Northwest 80D 2½-yd.; 1 Northwest 6 (1½-yd.) backhoe; 1 Unit truck crane with 1½-yd. dragline bucket, for moving mine waste and handling drainage.

Hauling: 10 Euclid 8-10-yd., 6 Euclid 15-yd. and 5 International 15-yd. rear-dumps, some sideboarded for handling lightweight coal waste.

Rock Drilling: 1 Ingersoll-Rand Rockmaster drill with 600 cfm Gyro-Flo compressor; 1 Reisch truck-mounted drill (both drills with 6 to 6½ in. down-hole percussion bits); 1 Cat D7 tractor mounted "Octopus," with 2 Ingersoll-Rand drills on hydraulic booms and I-R Gyro-Flo 600 compressor mounted on; 1 Gardner-Denver Air-Trac (3½-in.) and 4 Ingersoll-Rand wagon drills (2½-in.).

Bits: 6½-in. bits, Brunner & Lay Rock Bits, tungsten carbide tipped; smaller bits, Timken.

Compressors: 4 Gardner-Denver 315 cfm units.

(Drills and compressors, comprising relatively few units, have worked three shifts to balance with two-shift shovel operation.)

Scrapers: 3 Caterpillar DW21s with No. 470 pans, used for placing fill and stockpiling landscaping soil.

Tractors: 9 D8s and 3 D9s, one with Cat ripper.

Other: Case 420 tractor with front-loader and backhoe; 2 Cat 12 graders; six 10-ton 3-wheel rollers; a 50-ton rubber-tired compactor, and 5 Kohler-powered 5 to 10 kw light towers. Esso gasoline.

Explosives: Atlas ammonium nitrate, prills in bags, with Atlas 60% extra dynamite or Geladyne No. 1 as primer; Rockmaster delay caps.

GRADING STRATEGY

Continued from page 58

filling voids in a dozer mix. Production from all equipment has averaged 70,000 to 80,000 cu. yd. per week, double shift.

The question of unusual material disposition involved is what to do with pockets of extremely hard sandstone. This rock often has come out in fragments up to 5 ft. long despite every effort of the blasters (breakage pattern due to open seams from mine settlement, combined with extreme localized hardness). The decision was to waste most of these chunks rather than "plug" them or use a ball.

One disposal scheme for these big rocks (here pictured) was to utilize them in widening out the slope of an express roadway embankment. State specifications require that rock fills be brought up with a 2:1 slope, but for landscaping purposes this slope may be increased to 4:1. The wedge-shaped area between these two slopes, in this instance, was filled in during construction of the basic width, using the oversize rocks along with unsuitable mine waste. The big rocks and the rather fine-sized waste were mixed and keyed by dozers. This 4:1 slope leads down to a landscape area which was being built up simultaneously within the interchange. The slope was dressed out with earth for later seeding.

Filling of this kind which fits in with design purposes and minimizes haul of unsuitable material was cited by the Pennsylvania engineers here as an example of intelligent cooperation between project designers, field engineers and the contractors.

Good Material Reserved

All during the early grading, the contractors, again working closely with the engineers, kept on the lookout for material that needed to be reserved.

One such use is for the top 12 in. of embankments,

Slope being widened here to 4:1 as a means of economically wasting oversize rock and marginal materials from the excavation.

Rock fill for an express roadway is completed here to 2:1 slope using specification rock placed and rolled in layers.

which specifications require to be made of smaller material to insure a smooth subgrade for paving work. Maximum particle size for this last layer is 3 in., and compaction with 10-ton steel wheel rollers plus proof rolling with a heavy rubber-tired compactor are required along with compliance with the specified 100 percent density as determined by the ASTM T-99 (Standard AASHO) method of test. Some of this top-layer construction has come from shovels when fragmentation is good, and some from scraper material. In either case, topping out represents another example of planning "where to dig it" vs. "where to put it."

Another use of reserved material is for special subgrade and stabilized shoulder to be placed in the 1961 season. From either this project or another job which the contractor holds nearby, selected sandstone material is being stockpiled out of shovel operations for later processing. To quote the specifications, when the job is otherwise balanced, the contractor must replace 110 percent of any material reserved from the excavation that would have been suitable for embankment.

Mine Waste Disposal

The mine waste problem on this job is a story-within-a-story. Slatery breaker waste, "boney" (coal dust, slate and stones) and just plain coal dust of poor quality, mantle over an expanse of the right-of-way. This must be removed or graded down and pockets from worked-out mines must be dug out. The large amount of such material, plus the great area of right-of-way in the interchange, has required a compromise in the job design. As an ideal, the state engineers of course would like to see all the right-of-way covered with turf. Actually, a considerable acreage will be graded and topped out with this waste, which will not support turf. The available topsoil and stockpiled topsoil will be used to dress erodable slopes for seeding or sodding. Flat expanses will be blanketed over with the waste and left uncovered, as an expedient to get rid of it within short haul.

As a control over this waste, the engineers run tests on the carbon content. This content is limited to a percentage low enough to insure against any possibility of spontaneous combustion. Material running higher in carbon is wasted outside the right-of-way. Mine waste removal is handled largely by dragline or backhoe, loading into dump trucks, rear-dumps or bottom-dumps. Also, scrapers have moved some of this waste. No attempt has been made to compact it but merely to spread it evenly under close engineering control. About 50,000 cu. yd. of mine waste will be spread over the landscape to fill in low areas, which will improve the general appearance of other areas adjacent to the highway.

Pennsylvania's Specifications

This project which has required constant improvising in the best use of materials is thrown into perspective by briefly reviewing some of the ideas and intentions of the Pennsylvania engineers. Rock fills, of course, are considered as rock only where the fine distributed material is considerably less than sufficient to fill the voids. In the placing of rock fills on Pennsylvania state road jobs, a plan of operation is required to be agreed upon by the contractor and the engineer. As part of this agreement suitable subgrade and shoulder material for covering the rock is reserved from the excavation, as heretofore noted, preferably with the proviso that this does not involve rehandling or storing.

Opened seams added to the variables that made rock fragmentation difficult to control. Two 6½-in. drills handled the shooting where a full shovel face was involved.

The Inspector-in-Charge must make frequent comparisons of the drawings and cross sections with the class of material encountered in the excavation and available as embankment, during this stage of construction. If a change in the rate of slope appears desirable, the matter is called to the attention of the Construction Engineer in the district office of the Department of Highways.

Pennsylvania's specifications define various materials other than fine-grained soils as follows:

Rock is described as limestone, sandstone, etc., glacial boulders, old concrete, brick, etc., which when placed in embankment contains insufficient soil, granular material or shale to fill all the voids between the rock pieces, and which cannot be readily incorporated in an 8-in. loose layer.

Granular Material is all natural or synthetic mineral aggregates such as crushed or broken rock, natural run-of-bank or processed gravel, run-of-bank or crushed slag, granulated slag, sand, etc., which can readily be incorporated in an 8 in. loose layer and which at least 65 percent is retained on a No. 200 sieve.

Shale is defined as all rock-like materials usually thinly laminated, comparatively soft and easily split, formed by the natural consolidation of mud, clay, silt and fine sand.

Random Material is a term meaning any mixture or combination of the above defined materials suitable for use in embankment which can be readily incorporated in an 8-in. loose layer.

Soil, as differentiated from the foregoing, is defined as all earth materials formed by natural disintegration of rock through the processes of weathering, decay or chemical actions, and of which at least 35 percent will pass the No. 200 sieve.

Inspection Basis

In Pennsylvania, as in all states, grading work involving rock is considered to demand close and constant inspection control. C. H. Miller, Principal Construction Engineer in the Pennsylvania Department of Highways, told Roads and Streets that "with material other than soil, compaction is determined largely by visual movement under the roller or other compaction equipment as approved or specified. Our specifications require that the rock layer to be thoroughly keyed, with the larger rock well distributed and the voids filled with smaller rock pieces and spalls. If there is insufficient material to fill the voids on a contract job, it may be necessary for the contractor to go into 'borrow excavation' to provide the material, other than rock, to fill the voids. In any event, approval must be obtained from the engineer to justify such action."

"The fill foundation is a major consideration in securing a good job," Miller reminded. The area within the slope limits of embankments must be cleared of all trees, stumps, brush, including roots, and other objectionable material. Where light sod or vegetable growth exists, the surface of the ground is broken so that the material used in the embankment will bond with the original ground. In swampy areas, it may be necessary to drain the area first to permit drying, and any decayed or dead vegetation such as logs, trees and timbers shall be removed.

"The contractor," Miller continued, "is expected to schedule his work to permit fills to settle as long as possible before the pavement is placed. The inspector should carefully check the drawings and special requirements for provisions regarding the time required for settlement of certain completed embankments, prior to approving placement of paving. He should be alert as to any contract provisions for placing certain embankments in layers of one-half the normal specified depth."

Acknowledgments

The project here spotlighted is being built under the Scranton district office of the Pennsylvania department of Highways, Robert F. Riley, district engineer, James Mifflin assistant district engineer for construction and Joseph Jendrejenki resident engineer. James Monroe is general highway superintendent for Central Pennsylvania Quarry Stripping & Construction Co., with Patrick McGee job superintendent.

Court Decisions

Injunction Violated

Between the Ohio Contractors Association and a local of the International Hod Carriers' Building and Common Laborers Union an agreement had been made which, among other provisions, stipulated that should differences of any kind arise between any contractor and the union or employees, there should be no lockout or work stoppages on any work.

It was further stipulated that all grievances should be disposed of by a Joint Disputes Board and if that Board was unable to settle the question, the controversy should be referred to arbitration.

When a year later union members broke this agreement and picketed a project of the Central States Construction Company, one of the members of the Ohio Contractors Association, application was made by the association for a restraining order against picketing and otherwise interfering with the employees of the construction company.

This injunction was granted during the following week, restraining union members from picketing or otherwise interfering in any way with the contractor's employees or with the progress of the work on this project of the Department of Highways of that state.

Two months later the association asked the court to punish for contempt the men who at the insistance of the union had resumed the picketing of this construction job in violation of the injunction. Four of the pickets were found guilty and on each the court imposed a fine.

From that decision holding them in contempt the union appealed, contending that the court was without authority to impose these fines, by virtue of the Federal Labor Management Relations Act that placed the jurisdiction of interstate labor management government in the National Labor Relations Board.

Affirming the contempt judgment, the appellate court said, "We hold that the trial court, whether it ultimately determines that it has or does not have jurisdiction, upon a consideration of the merits of the case, did have authority to issue the temporary restraining order and the temporary injunction; that it likewise had the power and legal authority to punish for contempt those parties who flagrantly flouted its order prior to a determination of the jurisdictional question, upon a consideration of the case on its merits.

"We further hold that the question of jurdisdiction of the subject matter of an action cannot be properly raised in an appeal from a contempt conviction arising from a violation of a temporary injunction, before the court from which the temporary injunction issued, has had an opportunity to determine the question of its own jurisdiction by a final order or judgment.

"It would present a completely anomalous situation if a picket on a picket line were permitted to determine the jurisdiction of a trial court and having determined that it had no jurisdiction, to disobey its order without the trial judge even being given an opportunity to finally pass upon the question of the jurisdiction of the court over the subject matter of the action."

(Ohio Contractors Ass'n v. Local 894 of Hod Carriers' Building etc., Union, 162 N.E. 2d 155 Ohio, April 8, 1959)

Road Contractor vs Motorist Injury

A man riding in a car on a Mississippi road under construction was severely injured when the car left the road and hit a tree. His injuries were so severe that, in the words of the Court, he was turned into a "vegetable man." He brought suit against the highway contractor and the case was tried by the court without a jury. A judgment in the amount of $68,000 was rendered in favor of the injured.

The highway contractor appealed to the United States Court of Appeals, Fiftn Circuit, contending that the trial court had erred in finding the contractor guilty of negligence and in not finding the driver of the car guilty of contributory negligence. The Circuit Court of Appeals upheld the judgment, and in doing restated the legal principle that an appellate court will not ordinarily set aside the judgment of a trial court, in as much as the trial court has had an opportunity to observe the demeanor of the witnesses at first hand.

On this point the Court said: "The case is governed by well-recognized principles of law as to which there is no substantial dispute. Essentially the appellant asks this Court to set aside the findings of fact of the trial court as clearly erroneous, notwithstanding the superior opportunity of the trial court to judge of the credibility of the witnesses." (Bowyer & Johnson, Inc. v. Sanders, 271 F. 2d 275.)

Contractor Not Bound By Error, Court Says

A contractor who makes a serious mistake in a bid cannot be forced to perform under the contract, the Arkansas State Supreme Court ruled on April 18, 1960.

The unanimous decision, affirming Pulaski Chancery Court, means that the Ottinger Construction Co. of Ft. Worth, Texas, was on sound legal footing when it refused to sign a $1,329,371 contract to construct eight miles of highway in Mississippi County.

The decision also excused Ottinger from forefeiture of its $35,000 bond posted with the commission.

Ottinger said the $294,000 mistake was discovered when the bids were opened in May of 1959. The company engineer appeared before the commission the same day and asked that he be allowed to withdraw the bid.

The commission refused, sent the contract to the firm later for signing, and when it declined, attempted to collect on the bid bond.

The company took the case to court and won on all points. The engineer explained that the company bid 43 cents per cubic yard on embankment material, when the figure should have been 83 cents.

GarWood HOPPER TRAILERS ...SPEED HAULING OF SAND,

New Hauling Method Drastically Reduces Operating and Maintenance Costs

WAYNE, MICHIGAN—Gar Wood Industries, world's pioneer truck equipment firm, announces a revolutionary new bulk hauling method for any free-flowing material. Proved for the past eight years in widely diversified applications throughout the West, the method utilizes all-steel hopper trailers designed and built by Gar Wood.

Immediate and most important advantage of Gar Wood's hopper trailer method is the fact that far greater payloads can now be hauled over the nation's highways and roads. In addition, the method is much faster, less costly and there's no chance of damage or loss from spillage, weather, or contamination.

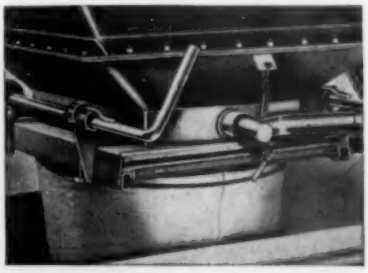
Payload increases and faster operation result from Gar Wood's exclusive Mono-Shell design which reduces tare weight, and from trailer design and mounting techniques that let Gar Wood distribute more weight over a much greater axle span. Mono-Shell hopper trailers let you increase legal payloads 23% or more per trip... even two or three tons more than other trailer methods.

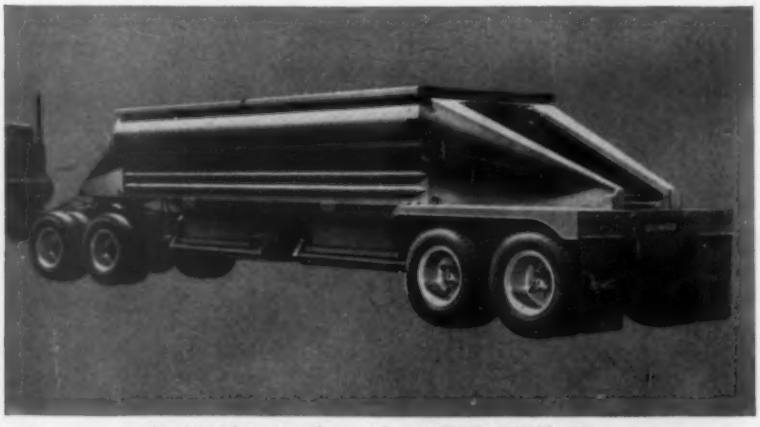
If you handle free-flowing materials of any type, the Gar Wood enclosed hopper method can provide an effective way to increase payloads and increase profits. It will pay you to get a complete payload analysis from your Gar Wood distributor.

PATENTED BUTTERFLY GATES INSURE FASTER, CLEANER, FOOL-PROOF OPERATION

Gar Wood's patented butterfly gates seal the load completely from dirt and water. They provide fast, safe dumping for powdered and granular bulk commodities... are safe and easy to operate... virtually maintenance-free. Removable sock assembly provides full protection from wind and weather during discharge, is easily attached, removed, and can be stored in weathertight compartment during transit. Only one sock needed per train.

For complete flexibility, Gar Wood offers a split butterfly gate. It operates either as a solid butterfly for cement and other powdered materials, or will handle aggregates up to 1½-inch diameter.





Gar Wood hopper trailer models are offered as double trains, and as semi-trailers for both single- and tandem-axle tractors.

Open Hoppers Ideal for Contractors

Contractor-type hoppers by Gar Wood are finding wide application in hauling dirt, aggregate, even hot asphalt. Hi-Tensile steel, all-welded construction makes them extra rugged. Yet light-weight Mono-Shell design means biggest legal payloads.

A complete line of discharge gates tailor Mono-Shell hoppers to your exact requirements. Gar Wood's air-powered clamshell gate has twin cylinders that close against the load. Optional cab-operated controls are widely used for fast, on-the-go dumping and windrowing.

Cable-operated door-type gate is ideal for pit dumping, plant-to-plant use and long-haul operations. Available with optional air trip or air rewind. Gar Wood also offers manually-operated clamshell gate, transverse spreader gate and rack-and-pinion gate models.

INCREASE LEGAL PAYLOADS GRAVEL AND CEMENT

GRAVITY UNLOADING METHOD OFFERS MANY ADVANTAGES

New Gar Wood Mono-Shell hopper trailers give you the benefit of gravity unloading, the most economical of all discharge methods. You save on first cost because there's no mechanical or pneumatic unloading equipment tacked-on to the trailer price. You save plenty on maintenance, too. Gar Wood's patented butterfly gates are virtually maintenance-free.

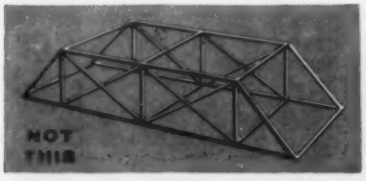
Added flexibility is another big advantage of gravity unloading. Long used by the railroads, this method is now available with high-speed, over-the-road truck equipment. You set your own delivery schedules! And, with compartmented Gar Wood models you can haul sand, cement, and aggregate all in the same unit . . . as you need them, *when* you need them.

Gar Wood's gravity unloading eliminates dead-weight mechanical or pneumatic discharge equipment . . . lets you haul 3000 to 4000 pounds *more* payload. In fact, the savings in weight alone can more than offset the cost of pit equipment.

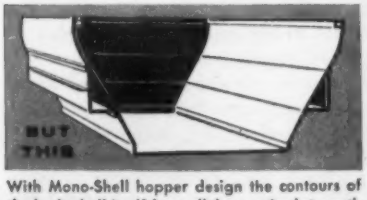
These models can be equipped with either permanent or removable aluminum domes. Loading hatches are fitted with vented, self-locking covers which allow free "breathing" yet keep water out. They offer complete all-weather protection for hauling cement, lime, chemicals, and other commodities.

Enclosed Gar Wood Mono-Shell hoppers are also available as semi-trailer units and can be equipped with one, two, or three discharge gates. Some models are compartmented for fast, positive cleanout and for hauling different materials on the same trip without contamination.

Mono-Shell Design Eliminates Dead Weight



Conventional design has heavy frame and cross braces that obstruct loading. Shell must still be added to this complex frame.



With Mono-Shell hopper design the contours of the body shell itself form all the required strength and support for a stronger, yet lighter body.

Complete Sales and Service Facilities Through Gar Wood Distributors

Mono-Shell hopper trailers and gates are sold and serviced by the nation's largest network of experienced truck equipment specialists. These Gar Wood distributors know your local hauling problems, understand your state axle-weight laws. They can show you how Gar Wood hopper trailers are customized to give you bigger payloads, and they will assist you in arranging financing.

FIND OUT HOW YOU CAN INCREASE YOUR PAYLOADS AND PROFITS
SEND FOR FREE CATALOG TODAY

Name_____

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City_____ State_____

☐ SEND FREE LITERATURE

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Type of material hauled_____

Present type of equipment_____

Tare weight of present equipment_____

Tons hauled per trip_____

Number of hauling units_____

Send coupon to:
GAR WOOD INDUSTRIES, INC.
Customer Service Dept.
Wayne, Michigan

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County's Emergency Center Outwitted Last Spring's Blizzards

At dawn on March 3, 1960, Baltimore County, Md., put into effect its snow control plan using a Snow Emergency Headquarters that functioned like well-oiled machinery. On that day when chaos gripped large areas of the East and Northeast, Roads and Streets visited this nerve center and found a well-organized compact group of county officials and volunteers calmly directing the dig-out of the winter's worst storm. While other cities along the East Coast were still in a tight snarl—this center, responsible for nearly 2,000 miles of metropolitan roadway, moved swiftly toward traffic relief.

A combination of planning and initiative kept Baltimore County roads open. At 11 pm on the 2nd—even before the storm began—all of the county's 15 highway division shops had men and equipment on the road and ready for a big one. At 6:30 am next morning, county executive Christian H. Kahl declared the first phase of a two-phase emergency plan to be in effect.

This initial phase consisted of the declaration of emergency through public media. It also prohibited parking on any of the well-marked snow emergency routes that extend some five miles beyond the limits of Baltimore City into the county. Under the legal powers of the first emergency phase, police were authorized to tag or even impound vehicles parked on snow emergency routes. In actual practice, the usual procedure was more gentle: owners were traced through their license numbers and were requested by phone to remove their vehicles.

Because salting and plow teams were on the spot when the storm began, Phase 2 was not required for this 10-inch blizzard. It hasn't been used, in fact, since the overall plan was developed under the supervision of county administrative officer William E. Fornoff in December, 1958. Phase 2 requires all vehicles using marked snow emergency routes to be equipped with chains or snow tires, else their owners face fines. Thus far, in the two winters since the emergency powers were authorized, the declaration of Phase I has permitted snow removal equipment to operate satisfactorily.

The county's early-March snow battle spotlighted afresh the Snow Emergency Headquarters in the basement of the new County Fire Department Headquarters building in Towson, the county seat. Here, the county's permanent Civil Defense communications facilities were put at the disposal of the county government according to a plan worked out after heavy storms of 1958-59. The snow emergency communication center was made up of three units (see chart): a message reception room; a radio room in constant contact with the police communications system and with a snow equipment dispatcher in the County Office Building; and a third room equipped with private lines to the utility companies, public information media, medical centers, etc.

Early in the March storm, two telephone numbers were released to the public by radio, TV and the press through the county public relations director. These public numbers were those of the Snow Emergency Headquarters message room, and up to five operators manned each number. Every incoming call was logged on a form listing 13 possible emergencies. The function of the answering operators was to list the call information and forward it for proper action to the private line room.

Here the call information was evaluated and acted upon. If it was a matter of highway clearance, the data sheet was rerouted to the radio room for relay to the highway equipment supervisor.

Snow clearance, of course, was the main line of work. For the March 3 storm, the county had 300 to 350 men operating 65 plow-equipped trucks, some 50 wheel-propelled spreaders and 10 motorized spreaders. Also under the jurisdiction of N. Charles Heinmuller, chief of the County Bureau of Highways, were 30 rented

Radio transmiter serving as the focal point of all highway clearance operations. This room is in continuous contact with the equipment dispatcher in the County Office Building; also monitors radios of supervisors in field.

In this second room, assistance calls are routed to the proper agency. Snow emergency communication does not depend upon public telephone facilities; it uses instead private open telephone lines from this room.

Message reception center in "SEH". Here incoming calls to two public numbers are listed for action by the appropriate personnel in either of two adjoining rooms.

Baltimore County's snow fleet consists mainly of truck-mounted equipment such as detachable plows as seen here, and cinder spreaders. The management problem is to have these units out early enough to keep on top of any developing blizzard situation.

Baltimore County snow emergency routes, identified by this sign, restrict parking during the first phase of emergency; require snow tires or chains during the second phase. The routes form a network for minimum emergency traffic and transportation.

units, mainly graders and dozers. Leasing is a big item in this area where the average fall does not justify heavy outlays for purchase of specialized snow equipment.

Thanks to the new Snow Emergency Headquarters set-up, the winter of early 1960 presented Baltimore County's 504,000 residents with a far different picture than that of previous years. The mere threat of a heavy snowfall put equipment on the road where it could go into immediate action. And only a phone call from the county executive was needed to set in motion one of the nation's best organized county snow emergency headquarters.

Pump Bureau Upgrades Capacity Ratings

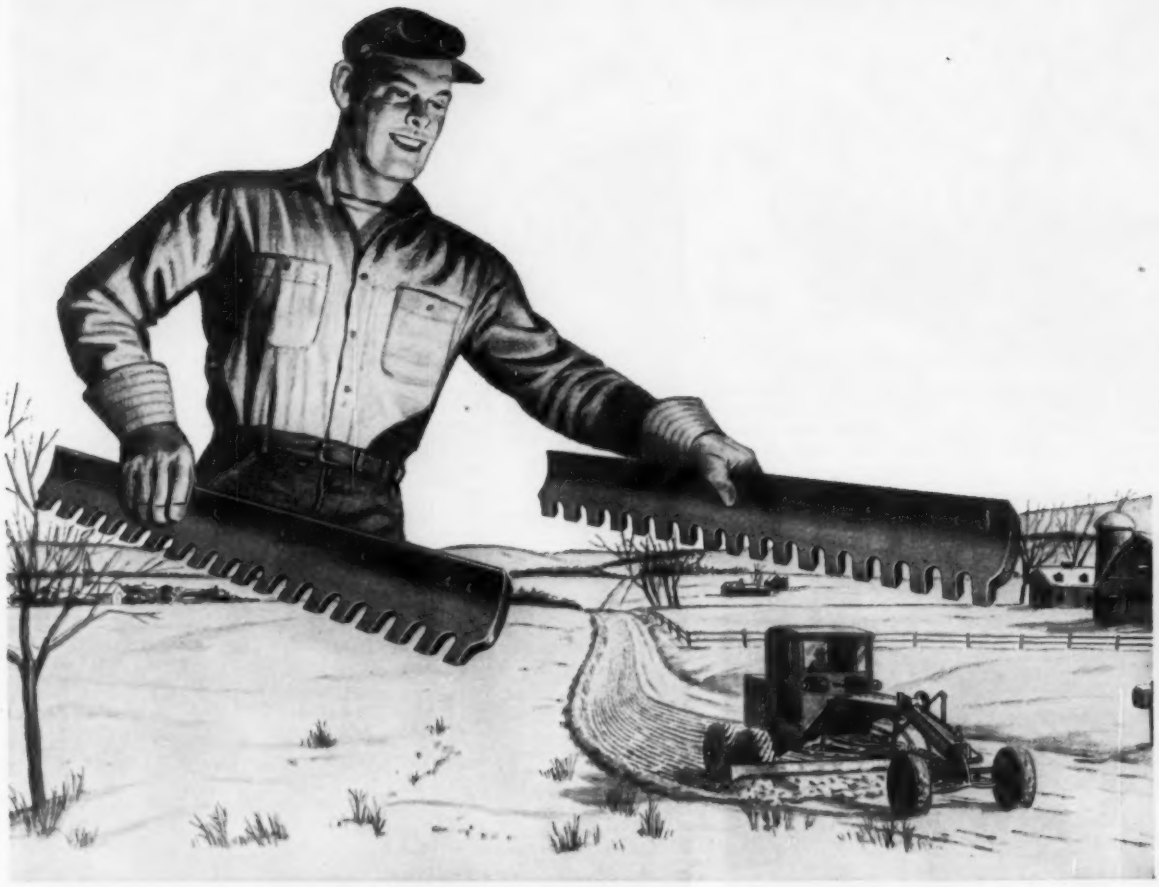
The capacity ratings of five standard pumps used in the construction industry have been uprated. As announced by the Contractors Pump Bureau, the 4M pump has been uprated to 5M, the 7M uprated to 8M, and the 15M to 17M. Also the minimum capacity ratings for the 10M and 20M pumps have been raised. These are self-priming centrifugal pumps.

The new ratings have been developed over the past year by the Bureau's Technical Committee, headed by J. C. Gorman of The Gorman-Rupp Company. He is assisted by H. E. Lieder, Construction Machinery Company; and R. D. Houghton, Rice Pump & Machine Company.

The Contractors Pump Standards of the Bureau are approved by the Associated General Contractors of America, Inc., with which the Bureau is affiliated. The Bureau was founded in 1938 with one of its main purposes to eliminate the many overlapping sizes of contractors pumps, and thereby make it easier for a contractor to compare competitive pumps. This was done by establishing minimum standards for each size. This standardization has also made it possible for the contractor to select the proper size pump to perform a specific job. In addition to aiding the contractors, these standards are used by most county, state and federal procurement authorities in purchasing.

The Bureau at its recent annual meeting elected John H. Hase of C.H.&E. Manufacturing Company as president for the coming year, with C. H. C. Van Pelt, Jr., of McGowan Pump Division, Leyman Manufacturing Corporation, vice-chairman.

The Bureau also announced that its new Contractors Pump Manual is due off the press late in the year.



The Image of CF&I provides long life in Scarifier Blades

The giant steelman is the symbol for CF&I's years of design and steel-making experience that result in such top-performing products as CF&I Scarifier Blades.

The special-analysis steel from which these blades are made assures high abrasion and fatigue resistance. And CF&I Scarifier Blades are cold drilled and punched to preserve the original properties of the steel. There are no hard or soft spots in CF&I Scarifier Blades. That's why they will outwear ordinary blades—giving you less equipment down-time.

CF&I Scarifier Blades are designed for your use.

- **Complete Selection:** CF&I offers straight-tooth and angle-tooth Scarifier Blade designs. Available in 6" or 8" blade widths and with ½", ⅝" or ¾" blade thicknesses, they are ideal for the rapid removal of ice and hard packed snow. In addition, these blades are excellent for smoothing washboard surfaces, so common to dirt, gravel and macadam roads.
- **Economy:** CF&I Scarifier Blades have the optimum number of teeth—five per running foot—which wear evenly, prolonging the working life of the cutting edge. Both the angle and straight-tooth designs groove and chip slippery road surfaces in a manner that provides better and safer surface traction. They quickly and economically open the way for a steady flow of traffic.

When you order Scarifier Blades—or any type of Cutting Edges—call your local dealer or contact the nearest CF&I Sales Office. They'll be glad to discuss your requirements with you.

7148

CF&I STEEL

CUTTING EDGES

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver
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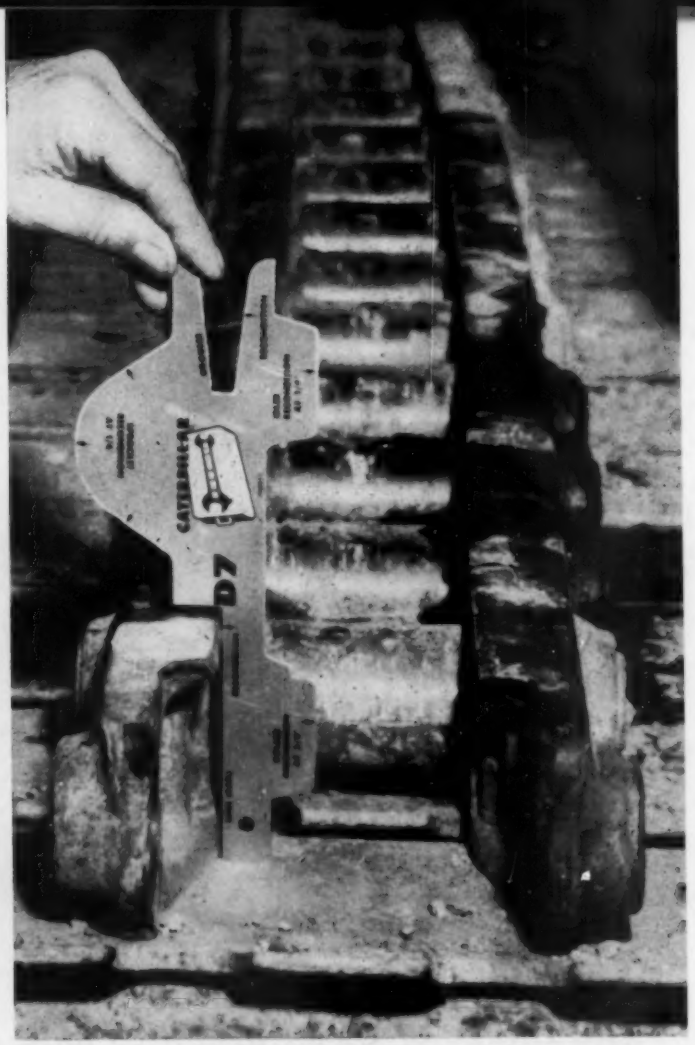
In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans
New York • Philadelphia

. . . for more details circle 289 on enclosed return postal card

Effective flap guard keeps dirt out of bearing surfaces of draft arm trunnion, protecting it and prolonging service life. Obert says device not final answer, but it does give some protection.

Keeping undercarriage free of dirt buildup, and careful maintenance, have meant long service life for this original sprocket, still true enough to keep on going as tested by this contour checking device.



Even after more than 3½ years' equivalent service hours in rock conditions, rails of Obert's oldest tractor show considerable wear life remaining. Black line, indicating wear point where reconditioning should be made, is half-inch below top of rail.

Tractor Undercarriages Still Going Strong After 7200 Hours

Road grading contractors may want to note the ideas on equipment care from this scraper owner

Working an average of 1,400 hours per year under "severe" conditions, a mid-Illinois contractor has amassed an unusual service record for his equipment. One machine had at last count more than 7,200 service meter hours and still has its original undercarriage components, except for rebuilt grousers.

And, in achieving this remarkable service history, contractor A. G. Obert has always gotten a full day's work out of his machinery. Stripping overburden for the Colchester Stone Company quarries, located in McDonough and Hancock Counties (Illinois), Obert's equipment spread of three Cat D7

Productive maintenance minded contractor A. G. Obert poses with his equipment spread during monthly winter checkup visits. Machines are warmed up at least once each month while the job is closed for winter.

tractors and two No. 70 scrapers has averaged 150,000 cu. yd. annually.

The vast majority of Obert's work involves rock, either as outcroppings or loose rock in the overburden. Haul distances vary, depending on the location of cuts and fills.

All three of Obert's D7 tractors (one series 3T and two 17A) have their original undercarriage components. The two others have

Concrete mix would grind the markings off most tapes!

This is Lufkin's Mezurall® tape . . . with unmatched Chrome Clad® blade that fights concrete, sand, mud and other abrasives.

Lufkin starts with a special tempered steel . . . bonds the markings to it. Then layer after layer of electroplating is applied, topped by a final layer of tough chrome. There's no other blade like it. Comes in 6′, 8′, 10′ and 12′ lengths . . . either ½″ or ¾″ widths. The Lufkin Rule Company, Saginaw, Mich.

Measure for measure, the finest made...

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Only with Link-Belt Speeder Diesel Pile Hammers

ALL HAMMER CONTROLS AT ONE MAN'S FINGERTIPS!

you start — *with the glow-plug and pressure fueling*
you drive — *with control from idle to full power*
you stop — *with safe, from-the-cab control*

Now — forget about the high cost of a separate throttle operator. Link-Belt Speeder self-contained diesel pile hammers are *one-man operated from the cab* — both crane and hammer.

Your operator starts in coldest weather or in soft ground . . . with a flip of the glow-plug switch. No dangerous climbing of the leads . . . no fussing with ether.

This same man controls the amount of fuel injected — keeps ram stroke at maximum. He can throttle it down to idle . . . or drive the pile with maximum power output.

He has fingertip, hydraulic-smooth control of unique Tri-Power cycling — pile preloading, high impact and two-way explosion. All keep the pile in motion *longer*.

Choose from 3 hammers: up to 7,500, 18,000 or 30,000 ft-lbs per blow — *double* the number of blows per minute of competitive diesel hammers. No job-slowing boilers, compressors or auxiliaries!

115-59N

Ask your Link-Belt Speeder distributor for free Diesel Pile Hammer Bulletin No. 2582-A, or write, LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA.

LINK-BELT SPEEDER

Also builders of a complete line of shovel-cranes . . . ½- to 3-yd., 8- to 75-ton capacities.

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5,106 service hours and 1,676 service hours respectively. Grousers of all three are rebuilt at least once each year.

Rollers, idlers, rails, pins and bushings and sprockets on all three machines, even the oldest (see photos) had considerable wear remaining in them when photographed.

Obert's secret for long-lived machines?—attention to the "little things:"

1. He says, "Keep the operators from turning too short. Don't let them make turns on a hill or sideslope unless they absolutely have to. Keep the turns lengthened out." Short turning, or turns on slopes and hills, he finds, accelerates wear on rollers and rails.

2. Also, Obert believes in productive maintenance. "Why take a chance on having a hundred dollars or so in repairs because of a few minutes or a few cents' worth of grease?"

In following his own advice, Obert's equipment undergoes accelerated lubrication and maintenance schedules. All rollers are greased every 16 hours. "They may not need it quite that often," he admits, "but, they almost always can take a touch of grease and this way I'm sure they never run dry."

3. Keeping the undercarriage clean and clear of dirt and foreign matter is another big item in Obert's productive maintenance philosophy. Again, he finds that a few minutes spent shoveling away packed-up dirt and stones pays big dividends in keeping machines on the job.

To keep in close contact with his machines and give overall supervision to the job, Obert himself operates the older D7, fitted with a straight blade. He uses this rig for pushing the D7-No. 70 combinations and for utility dozing and pioneering.

Being in such close contact with the job, he has no hesitation about signalling his two operators to stop and clean dirt from their machines undercarriage, or telling them when he feels they should lengthen out turns or spread the fill more evenly.

4. A prime factor in Obert's maintenance program is encouraging his operators to report or check into anything that seems amiss with

the equipment. "Most of the time," he explains, "they'll tell me it doesn't sound quite right, or there's a funny noise in the transmission or something, and it won't amount to anything; but, the main thing is, they pay attention to their machines and listen for possible trouble."

5. Working in the proper gear also has a great affect on extending service life, he finds. Never really "pushed" for high production, Obert finds he is able to maintain nearly as high production with the tractors working in lower gears than if the operators attempted to cut cycle times by shifting into higher gears coming out of the cut.

"I tried it one time", he recalls, "and worked my head off for an hour or so, shifting up and down while the other rig kept in a lower gear all the time. When it was over, I hadn't moved much more dirt, but I sure had worked myself and that machine a lot harder. It wasn't worth it."

Obert's close attention to the little details has paid big dividends. In seven years work on the Colchester Stone Company quarries, he has *lost less than one per cent* of available work hours from downtime. All major overhauls—and there has been very little of that—have been handled during winter months when the job is closed down. The only major work to date has been a "ring job" and a final inspection on the oldest machine.

No novice in the earthmoving business, Obert started on his own as a contractor in 1946 after 19 years as a crane operator for a Peoria contractor.

His first machine was a used Caterpillar "Forty", a three cylinder tractor last made in 1946. Several months after this purchase, his order for a new D7 was filled by Peoria Tractor Co., and after taking a second mortgage on his house, Obert accepted delivery and began looking for work for the new machine. "I'd do anything," he recalls now, "there wasn't a job too small for me. When I didn't have a job right at that moment, I was going down the road hunting one. There really was never a time when I didn't have at least one job lined up for when I finished the one I was on at the time."

Obert began the Colchester Stone Quarry job seven years ago on a 30-day trial, working on a per-hour basis. His only requirement was to stay ahead of the quarrying schedule. In the intervening time, his spread has grown from the one D7-No. 70 rig to the present three D7 Tractors, two No. 70 Scrapers, two straight bulldozer blades and a towed ripper.

Long Prestressed Beams Set in Florida

Seen being placed here for the new 36th Street Expressway in Miami, Florida, are prestressed concrete beams 103 ft. long. Believed to be a state record for beam length, the units were fabricated by Maule Industries, Inc., for this overpass. Each of the 20 beams contains 23 cu. yd. of concrete and weighs 42.5 tons.

Boat-shaped scraper with folding blades devised for culvert clean-out.

Silted Culverts Cleaned With Bladed Drag

Wind blowing dirt into culverts in Southwest Kansas evoked the need for equipment that could open and clear the blocked culverts. When the state highway district engineers began surveying the problem, they discovered that nobody manufactured any device to meet such a problem.

T. D. Thompson, of Syracuse, put his ingenuity to work to refine an idea for a device the group of engineers in the district had previously decided upon. The principle was to create a scraper that could be pulled through the culvert to drag out the mud and debris. Thompson's machine was boat shaped, with hinged blade hanging down and a cable fastened to either end. Using any equipment near the site—trucks, tractors, graders—the "boat" could be pulled back and forth through the culvert. The model that finally worked (patent applied for) was the original boat-shaped device with folding blades. When this unit was pulled through, the blades could fold back to allow it to be pulled back from the opposite side.

Wind or water caused culverts to fill with dirt—a familiar problem.

Truck and tractor each with power take-off drag the scraper back and forth through the culvert.

Top Performance

...a result of technical exploration

Whether at the poles or in the plant, exploration is the key to technical progress. So it is at Yale & Towne — where Trojan engineers design, develop and test materials and methods that make Trojan tractor shovels the Top Performers on thousands of jobs from busy local streets to barren foreign wastelands.

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TROJAN TRACTOR SHOVELS ARE AVAILABLE IN 8 MODELS, LIFTING CAPACITIES FROM 6,000 TO 24,000 LBS.

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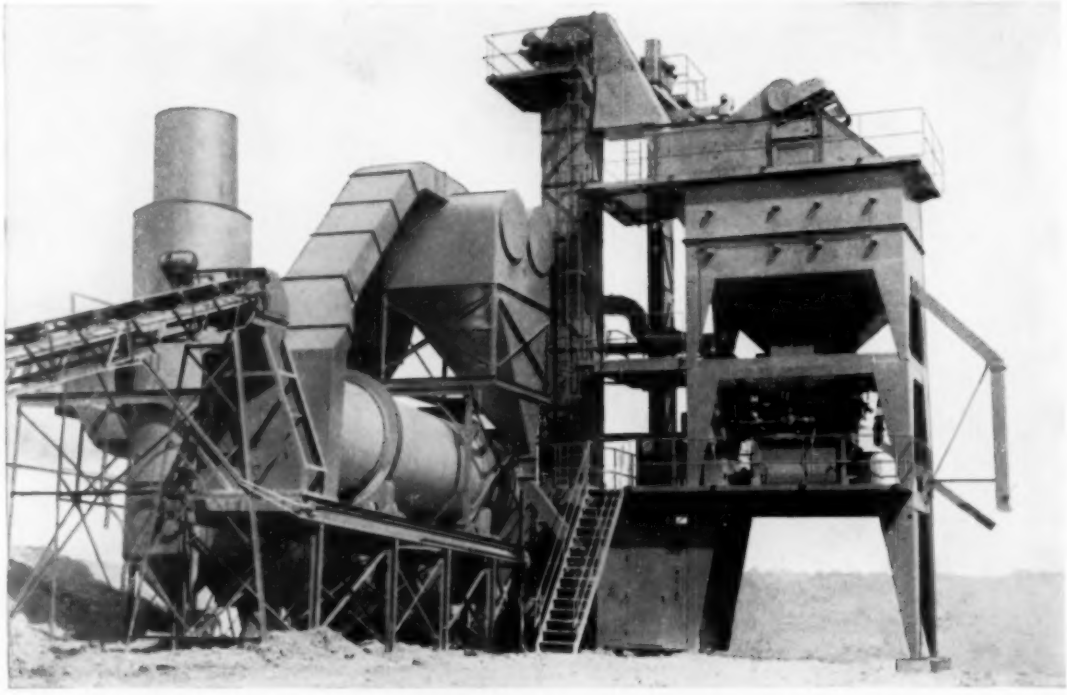
First Of New "B" Series

Type "T" Hetherington & Berner Asphalt Plant goes into operation in Western Pa.



GUEST OF HONOR at a special Open House recently held by Northern Industries, Inc. at Gibsonia, Pa., was the new T-50B pictured above.

LOUIS EKIN, president of Northern Industries, Inc. said "We would like to extend a special invitation to all interested parties to see our new facilities in operation."

Features of the plant include:

FEED HOPPER—A four compartment, truck-charged 225 cu. ft. feed hopper with Syntron vibrating feeders controlled from the plant mixer platform

DRYER UNIT—An 88" x 32' dryer unit with Ducon UW-4 secondary dust collection and automatic H & B-Maxon gas combustion unit, started and controlled from the mixer platform

GRADATION UNIT—A Deister 3½ deck 5' x 12' horizontal vibrating screen with vibrating dampers and reversing switch wired into the stop circuit

OVERSIZE HOT BIN—A 75-ton 4-compartment hot bin, with hi-low Bin-dicators and indicator lights over the mixing platform

ELECTRIC TANK HEATING—A/C tanks heated by Hynes Electric units, and jacketed pump and transfer system heated by Hynes Electric hot oil circulating system

AUTOMATIC WEIGHING and sequencing with Howe Hi-Potential cut-off scale unit and H & B Fluidometer system

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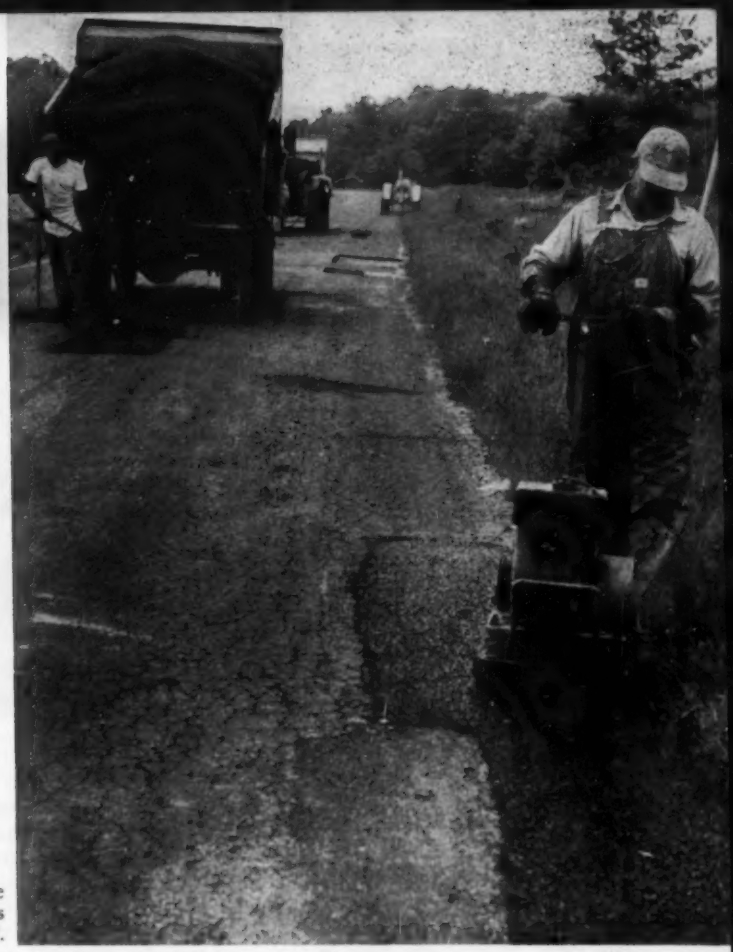
Bituminous Roads And Streets

Bituminous features appear between pages 127 through 142



Delaware maintenance engineers are experimenting with various aggregates to best utilize the CEMC-2 material.

CEMC-2 Patching Mix Does Well in Delaware

By S. S. Scarborough
Testing and Materials Engineer,
Delaware State Highway Department

Almost any piece of cloth can be used to patch clothes, but, the requirements for a good patch material for highways are sometimes difficult to meet.

Delaware, where the two lower counties rise not more than 60 feet above sea level, has its share of patching problems. The testing division of the Delaware state highway department runs a continuous check on patching materials to find the one that will most nearly suit the needs.

The ideal patching material should be easily handled by workmen in the field. Since this may involve working the material after long periods of storage, the ideal mix would remain unchanged during the storage period and would "set up" only after it was placed. In reality, of course, all material is affected by some hardening from loss of volatiles.

Good patching material must be economical, and the initial cost is not the only factor to be considered. Performance, handling qualities, storage factors and the probable life of the material after placement are critical factors.

In the past, patch mixes containing RC-2 and RC-3 have proved to be very difficult to handle after relatively short periods of storage. A crust forms on the pile, which makes loading and compaction difficult. Since the crust that formed was useless, it had to be discarded, making a significant waste factor.

In addition, performance in the field was far from satisfactory. The material soon became brittle. In wet weather the mix would loosen and be gouged out by traffic.

Obviously, much of this difficulty

An extensive patch area being placed on U. S. 13 in Delaware. Careful workmanship includes good raking and rolling.

was caused by the rapid curing of the RC-2 and RC-3 cutbacks. Because of this, it was decided by the Testing Division, to try CEMC-2 on a trial basis.

This material was first tried in late 1959. Mixing was done in the maintenance yard with a grader after the stone had been leveled and the CEMC-2 had been applied. No unusual problems were encountered and the CEMC-2 proved easier to mix than RC-2 or RC-3, especially when the stone was wet.

The performance of this material has been carefully observed and all indications are that it is the best yet available in its class.

Maintenance crews report that the mix is easily handled and works very well even at low temperatures. Storage had not presented any of the usual problems that occured with mixes of RC-2 and RC-3. For instances, very little crust forms during storage and what there is can be easily pierced with a shovel. The depth of this crust is about ¾ in. and in handling, this breaks up very easily and blends with the fresh material.

The presence of water in the patching area seems to have little effect on the bonding properties of the mix. Several patches were actually placed in water. No difference has been discovered between these patches and those placed under nearly ideal conditions.

The new material has also been used to patch the edges of surface treated roads that have cracked and crumbled. Here, too, the results have been excellent, even where the material was actually placed in water. Thus far, in all the patches and road edge replacement, not a single failure of the material has been found.

The surface of all patches are well compacted and well cured. However, if the surface (which varies in thickness from ¾ in. to 1½ in.) is pierced it is found that the underlying material is still "alive" and quite workable.

Of course, the price per gallon of CEMC-2 is higher than RC-2 or RC-3. However, experience has shown to date that because of the smaller asphalt requirement of mixes made with CEMC-2, the over-all cost per ton, of mix is less. One county maintenance division shows a cost per ton of $6.85 for RC-2 and RC-3 mixes. The comparable cost for CEMC-2 is $6.50.

The aggregate presently used in the mix consists of a combination of Delaware No. 107 and "rice" stone. Various combinations have been tried and at this time no conclusive data are available as to the best combination. The trend is toward a finer mix which would result in fewer voids in the material after it was placed.

While this new material has solved some of Delaware's patching problems, the Testing Division is still not satisfied that this is the answer. Like all testing people, the division still conducts regular searches for something even better. But for the time being mixes using CEMC-2 are the best Delaware has used.

De-Icing Salts Use on Asphalt

Studies were recently initiated in The Asphalt Institute's laboratory to determine the effect, if any, of de-icing salts on asphalt pavements. Although field studies have indicated that there is no problem, documentary evidence has been lacking. Laboratory testing, literature searching, and field observations are included in these studies.

A proposed year-long study will include subjecting dense-graded surface course mix test specimens to repeated immersion in salt solutions and then recurrent dryings. The specimens are systematically checked for strength, absorption and asphalt property changes against controlled test specimens aged in air or immersed in water and dried.

Dragline gets inspection from Keith Hutchison, Greer vice president and technical director, Phil Owen and Chuck Daub (l. to r.). Owen and Daub are Standard Oil lubrication specialists who render the school technical assistance on lubrication problems. Both have engineering degrees and both have completed Standard's Sales Engineering School. Daub has ten, Owen five years of field experience serving commercial customers.

Standard Oil helps this school teach men how to keep a construction job going

Greer Excavating and Mechanics School has learned one of the lessons it teaches — how to keep equipment in service

Situation: Time is money at Greer Excavating and Mechanics School, Braidwood, Illinois. The school promises its students hours of experience operating equipment. It teaches them how to maintain and service the machinery they work with.

Up to 70 students, guided by nine experienced instructors, work 26 pieces of equipment almost every daylight hour, seven days a week, winter and summer.

What was done: From the first day of school more than three years ago, Greer Institute's equipment has been serviced exclusively with Standard Oil gasoline, diesel fuel, motor oil and greases. Phil Owen, an experienced Standard Oil lubrication specialist from Joliet, just 20 miles from the school, makes regular calls to check out any lubrication problem. From Wilmington, only 5 miles away, Standard Oil agent R. J. Kavanagh makes deliveries of gasoline, diesel fuel, lube oil and grease as often as every other day.

What you can do: To get this kind of service call the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write, **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

You expect more from **STANDARD** *and you get it!*

Plenty of dirt to work with. School site is on 1,700 acre tract that has been ripped, torn and piled as result of strip mining. Here student is learning how to operate skid shovel.

Finisher equipped with special profile correcting control device. Stringline is seen at left.

Motor grader has bladed out failed areas in old pavement.

Economy Mix, Overlay Refinements, Upgrade Farm-Market Road

By H. K. Glidden
Contributing Editor

When an aging secondary road needs resurfacing in western Kansas, the problem is to provide greater load carrying capacity, and also a new standard of evenness for high-speed farm access and truck traffic. Old bumpy surfaces with irregular, high crowns are no longer safe enough for the wheat belt tempo.

Kansas has many such roads that need upgrading as well as physical restoration to forestall high maintenance. With limited funds to go around, the Kansas Highway Com-

Cedarapids screening plant, Lorain motor crane, Barber-Greene cold feed bins and Barber-Greene 848 continuous hot-mix plant comprise this assembly which turned out 150 tons of hot-mix per hour.

Etnyre 1050 distributor on International S180 used to tack coat all areas.

A more extensive base repair operation found necessary after construction hauling over the binder course.

mission has often made use of local materials in prescribing its "economy mix." Formally called Bituminous Mat aggregate, this material is a hot plant mix made with a single uncrushed aggregate with necessary correction.

This is a cold mix type of construction and this project is utilizing an aggregate of the type previously used for cold mix in a hot mix method of preparation. In the opinion of observers, the hot mix method as used in this project has greatly improved the quality of work. As time goes on and more hot mix equipment becomes available in the Kansas program, almost all such construction may be processed in this manner.

In Kansas also, a special technique is gaining in application for ironing out wavy profiles when placing bituminous overlays. Even on the lesser roads in this region of "wide open spaces," traffic moves at the top legal limit, and farmers and truckers literally judge the work on the state highway by the riding quality at 60 mph.

Described here is a project which reflects the Kansas practice in the use of the economy mix as well as the new evenness control in resurfacing. The project, completed during the 1960 summer, consists of 23.2 miles of K23 north of Meade, Kansas.

This important feeder road leads into US 54. K23 had a 24 ft. bituminous pavement built in 1934 and last reworked in 1947. The roadbed with its 5¼ in. crown and thin

Continued on page 134

The big gravel-sand pit—best material found at 8-ft. level above bottom, bottoming 46 ft. below ground level. Two Cat D8s handled pit and stockpiling.

Kaser's Barber-Greene 828 Stabilization Plant is shown in a quarry near Dexter, Ia. The 828 hydraulically erects itself in just two minutes after being towed to the job site. Heavy duty Barber-Greene portable conveyor and special 36", reciprocating feeder and trap complete the installation.

STABILIZATION MIXER ERECTS TWO MINUTES, TOPS

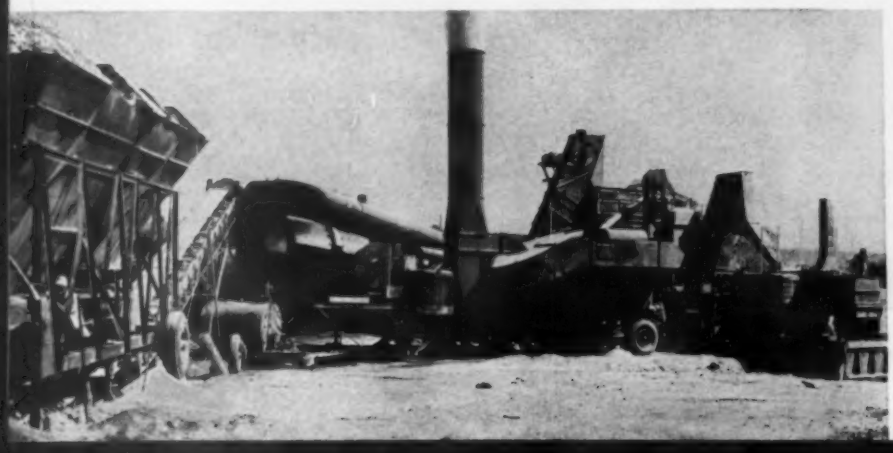
Barber-Greene self-erecting, portable plant gives Iowan low cost output; his two Barber-Greene asphalt plants combine to produce 1,000,000 tons of hot mix.

Don Kaser of Des Moines wears two hats: 1) spokesman for high type asphalt paving as a founder and past president of the Iowa Asphalt Paving Assn.; and 2) producer of high type asphalt paving and base mixes as head of Kaser Construction Co.

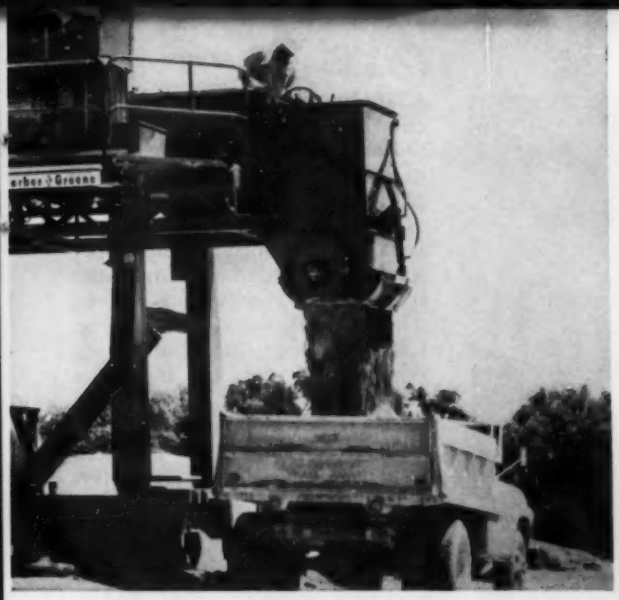
He's a user of Barber-Greene asphalt paving equipment since 1954 when he bought his first 848 Continuous Mix asphalt plant. Two years later he added a second 848 plant. Since that time these plants have combined to produce 1,000,000 tons of high quality, low cost mix.

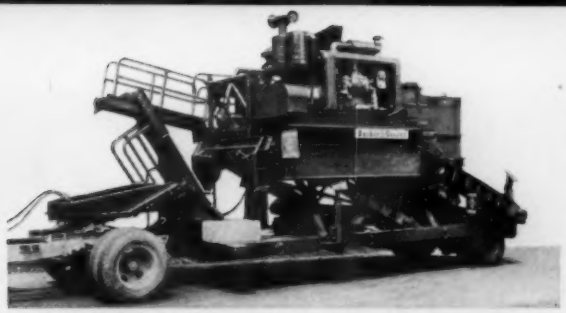
Kaser Construction purchased their new Barber-Greene Model 828 Self-Erecting, Portable Stabilization Plant in 1959, and Don Kaser reports, "production was 130,000 tons the first year and we expect to mix 200,000 tons this year.

"We average 500 tph, but top 600 tph during peak periods. The 828 gives us control to meet specs easily and capacity to keep up with as many trucks as the contractor can provide. These features plus 2-minute hydraulic plant erection and complete portability let us handle jobs more economically than when we mixed and spread



This 848 Barber-Greene Continuous Mix plant is producing Hot Mix Type A for the Kaser firm on a $1,000,000 contract at New Sharon, Ia. Both plants operate at a peak of 250 tph and require an average of four days to move — smoke to smoke.





Model 828 Self-Erecting Stabilization Mixer shown in travel position.

IN 600 TPH

on the road bed with a grader. Now we get far better accuracy by central plant mixing, hauling to the site and putting in place with a spreader."

Full Stabilization Plant Line — This self-erecting Model 828 is but one of four units in Barber-Greene's No. 1 stabilization plant line that offers a production range from 200 to more than 600 tph. The big 828 is also available in portable and stationary models. The smaller Model 824 produces from 80 to over 200 tph. All models are backed by unmatched experience in continuous material handling and control—your assurance of highest tonnage at lowest cost. See your Barber-Greene Distributor for the plant and the conveyor matched to your needs.

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The renewed highway getting its final rolling for good mat density and evenness.

Tampo roller is working on 24 ft. paved entrance to farm house.

ECONOMY MIX

Continued from page 131

base section had become expensive to maintain.

The solution decided upon was a variable thickness bituminous overlay; but experience had shown it to be difficult to get a profile on overlay jobs even enough for 60 mph traffic where correction of considerable roughness is involved. The contractor, San Ore Construction Co., Inc., voluntarily agreed to place the overlay to a corrected stringline grade by the method developed by Frank Drake, general inspector for the Kansas highway department.

Rough-O-Meter readings subsequently confirmed the effectiveness of string-lining the grade—few pavements have better riding quality than that obtained here.

San Ore took the job under a pair of contracts totaling $308,878. Work was started in mid-May, 1960, with 60 and 50 working day time limit. The major contract items for the 23.2 miles were 53,475 tons of aggregate (at $2.80), 706,703 gal. of AC 7 asphalt (9.5 cents), 1,222 stations of shoulder ($10.00) and 4,986 lin. ft. of concrete erosion checks ($4.50).

Design. Glenn W. Guthrie, resident engineer, in preparing the plans, first restaked the road to the exact 1934 profile and alignment; it had been decided that no money would be spent to improve either sight distances or vertical curves. The next step was cross-sectioning. Guthrie took the breaks and a section at least every 500 ft. Spikes were driven at 25 ft. spacing along the centerline and an accurate centerline grade established. This field work moved about four miles a day.

Office work consisted of plotting the centerline profile to a horizontal scale of 2½":50′ and a vertical scale of 2½":1′. The design grade was then devised, attempting to maintain 1 in. minimum leveling course and 1½ to 2 in. surface course thickness. Vertical curves were approximated by the use of spring steel wire, thumbtacked into the best visual position. Pavement thickness at centerline was then recorded in a field notebook for each 25 ft. station. The new pavement cross section was crowned 2 in. in 12 ft.

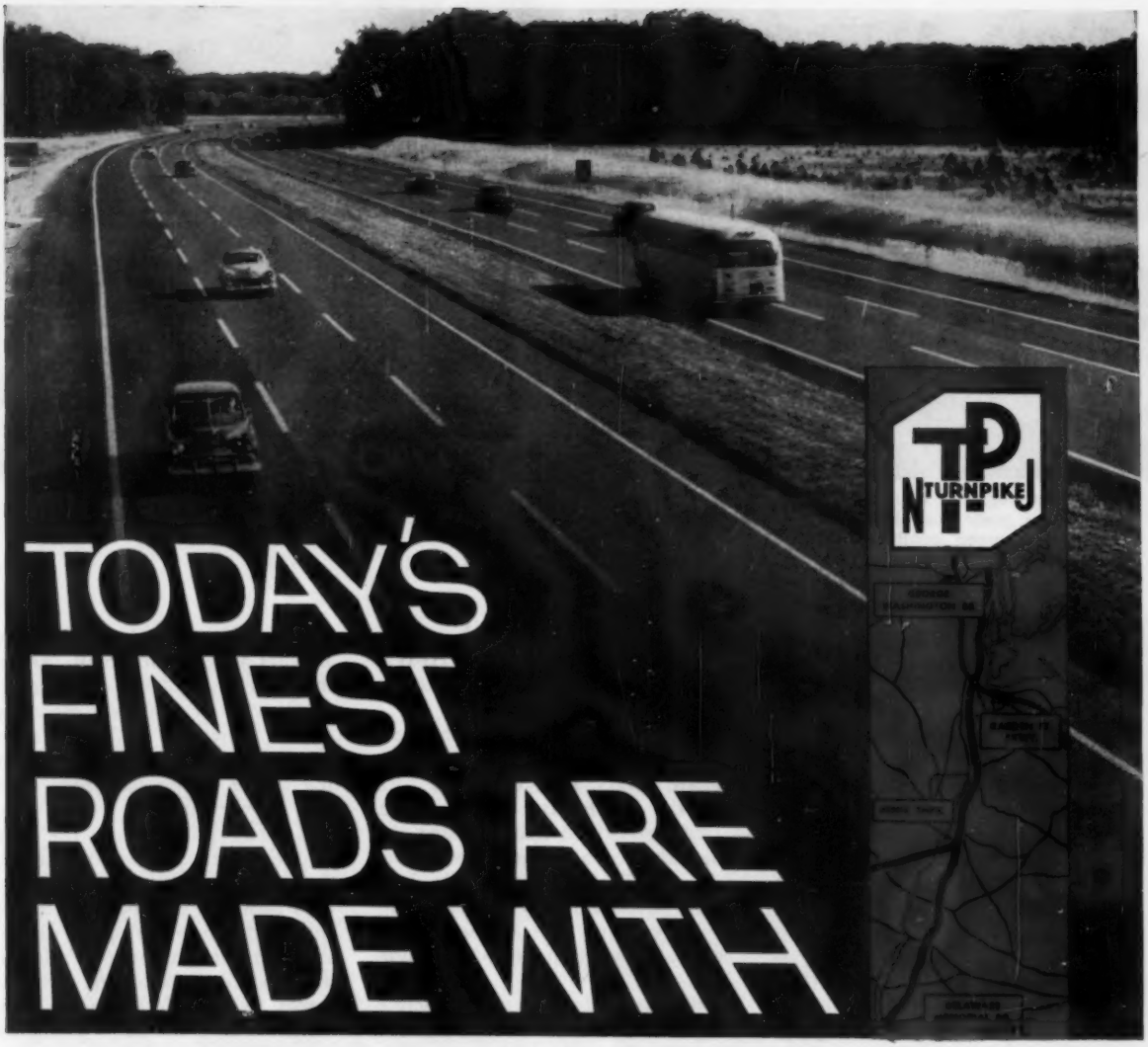
The result was a wide variation in pavement thickness. The first or leveling lift ran from 1 to 5½ in.; the second lift from 1½ to 2 in. Final quantities were about 10 percent over the estimate, but the desired smooth-riding was achieved.

Roadbed Preparation. All weak spots were first corrected in the existing pavement. Many of these spots were obvious from normal traffic and more developed in early summer under the hot-mix trucks. Some failures were disclosed only by the shoving of the new hot-mix leveling course, necessitating last-minute correction. All failures appeared to result solely from inadequate thickness of the original pavement.

The first step in correcting weak or failed spots was to blade the areas down to a solid foundation (usually about 8 in.), and push the loosened material into the ditch. The exposed area was then tacked using an Etnyre 1050 distributor on an International S 180 truck. Hot-mix was then placed and compacted to the original pavement grade.

Aggregate Production and Hot-

Continued on page 136



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Resident engineer Guthrie points to pivot bearing of transverse grade control device. Seen also is oil-filled pipe used to dampen pendulum which keeps cross member level.

Illustration of use of height blocks at stringline tie-down point.

ECONOMY MIX

Continued from page 134

Mix Plant. The plant mix used on this secondary road project is of interest as an example of a natural-aggregate mixture produced with screened but uncrushed gravel. The contractor set up a Barber-Greene 848 continuous type asphalt plant at his aggregate pit along the job. By working this pit to a depth of 46 ft., Lawrence Janke, contractor's superintendent, produced all aggregate except filler material. However, the process required rejecting about 50 percent of the material dozed into the hopper. Rejects remained the property of the landowner. Minus 200 filler was trucked in from another source.

Hot mix was produced at an average rate of 150 tons per hour. The plant location and arrangement combined aggregate production and hot-mix operations to reduce aggregate hauling and handling to a minimum. Two Cat D8s with U-dozers worked the pit and dozed stockpiled aggregates. Raw aggregate was belted onto two 10-ft. Cedarapids 2-deck screens, where minus $\frac{5}{32}$ in. fines were separated and wasted. Specification material, thus simply produced, was dozed into a stockpile and rehandled into the hot-mix plant's cold feed hopper by a Lorain motor crane with 1-yd. clamshell. A Cat D326 diesel electric set powered the screening plant and a Cat 311 the hot plant. The drier was gas fired. A Hi-Way oil heater governed asphalt storage and mixing temperatures.

Hot-Mix Placement. The contractor used two Barber-Greene asphalt pavers, each equipped with Drake's stringline grade device. Janke explained that by using the spreaders on alternate days he was able to eliminate the 2 mile dead haul (approximately one day's run) and yet carry the surfacing full width as he went down the highway.

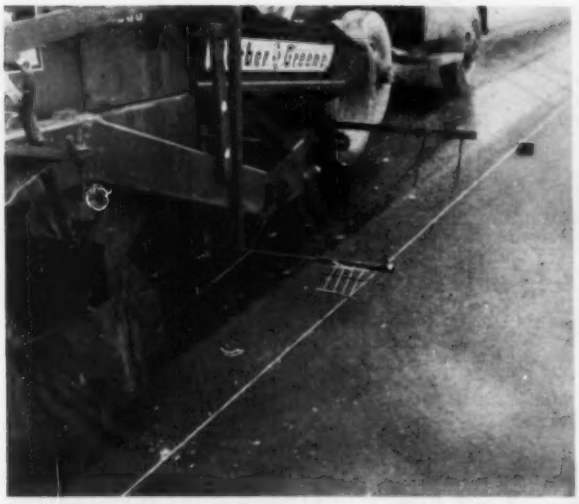
Briefly explained, the principle of Drake's device is to warp the screed so as to keep the centerline grade accurate and at the same time control the pavement crown. Warping the screed requires two operators; one adjusts a screw which controls centerline thickness while the other watches a separate screw for shoulder thickness control. Each man watches a telltale device which allows him to turn the screw up or down so as to keep the pointers matched.

The centerline screw tilts the screed so as to keep two pointers matched as a light plastic frame rides the stringline. The stringline was placed and set to grade by two state employees who followed the previously prepared notes. The stringline (binder twine) was stretched tightly between 100 ft. tie-down points, where string elevation was set using 2¼ x 3¼ x 4¼ in. wooden blocks with sawed notches at ¼ in. intervals. (A second block was placed over the first where the new grade was more than 4¼ in. above the old.) The string was placed in the notch corresponding to the design pavement thickness for each station.

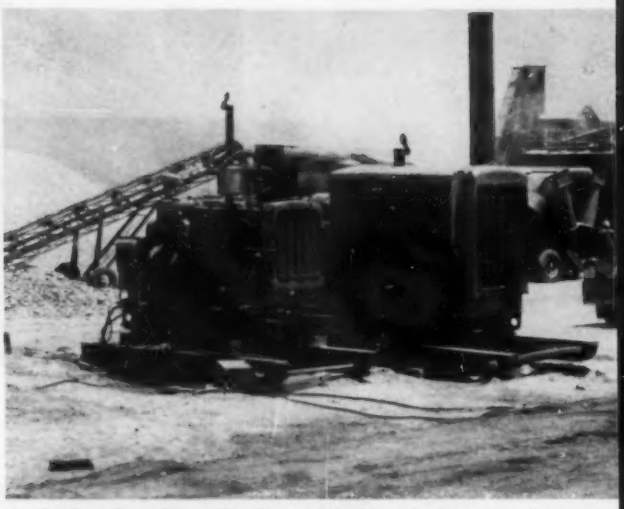
During paver runs the lightweight plastic pointer did not depress the stringline. The contractor's men and the engineers agreed that laying to the stringline did not slow up this paving operation in any manner whatsoever. Obvious errors in the plotted grade were caught by "eyeballing" along the stringline. Stringlining was not considered necessary on the second lift.

Breakdown rolling was by Buffalo-Springfield 10-12-ton steel wheel roller. Final compaction was by Ferguson and Tampo self-propelled pneumatic rollers. High densities were common. After serving three weeks under traffic, pavement weight of 135 lb. per cu. ft. was shown by cores.

Spreader Modifications for Stringline Control. The sketch and photographs illustrate the inexpensive modification required for this stringline control. This modification was made for San Ore by the personnel of Broce Construction Co., which has had experience with the method. A wood frame with a metal turnbuckle is used, with the longitudinal member fastened to



Close-up of plastic device riding stringline. Carpenter's level hanging upright is used only for occasional transverse checking.



At the San Ore plant: Cat D311 electric set in foreground handled screening. Cat D326 furnished power for hot-mix plant.

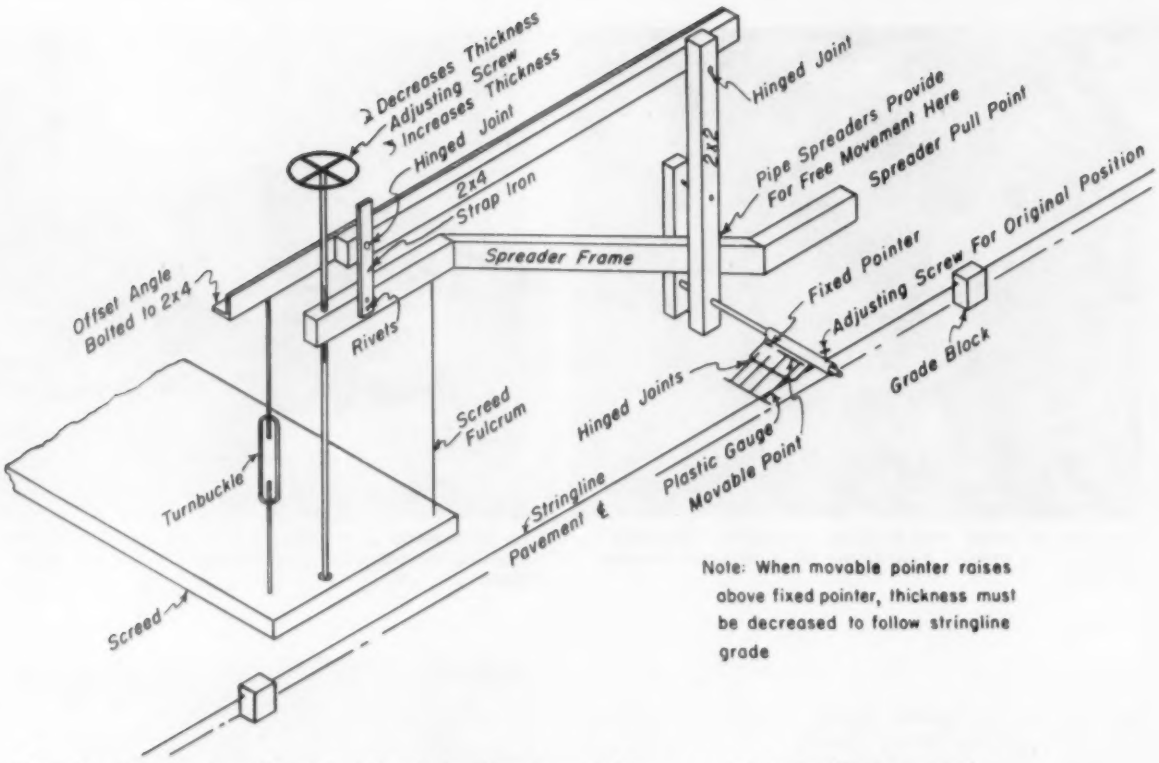
the rear of the finisher screed to actuate the pointer through a series of levers. This is done identically on both sides of the finisher; these are fastened together at the front by a cross member for bracing purposes only. The spring locks on the control screws of the screed were removed to allow quick and easy turning of the screws.

In operation, the first step was to block up the screed to average design thickness, in order to position the stationary and movable pointers exactly opposite each other. Paving was then started. As the thickness varied, the pointers would move apart. It was the operators job to turn the screed adjusting screw so as to keep the pointers matched, and thereby constantly change the thickness under the screed. Properly carried out, the final surface exactly followed the stringline grade. The operators had no difficulty after a brief training period.

Transverse Grade Control Modification. The modification for transverse grade control is shown in the accompanying photographs. A level extending the full width of the finisher was attached to a pointer which allows the shoulder-side operator to maintain an exact 2 in. crown, regardless of the varying course thickness at the centerline. The level consisted of a tapered aluminum U-section pivoted at the

Cat DW15s hauled shoulder dirt which the belt loader could not reach.

Dumore elevating grader on Cat 12 motor grader excavated ditch to provide most of shoulder material.



Schematic diagram of modification designed for bituminous finisher as an aid in overlay mat control.

center. This member was kept constantly level by a heavy oil-dampened pendulum at mid point. Freedom of movement at the pivot point was provided by a ⅜ in. rod as the horizontal axis riding in ball bearings as the transverse axis. A piece of 8-in. pipe housed the pendulum and was filled with 90W transmission oil.

The San Ore staff is considering further refinement in the finisher control as a result of this project experience. This may include Preco control using electronic equipment to actuate warping of the screed's shoulder-side.

Related Construction Items. Shoulder grading and cleaning of structures followed closely behind the finished paving. The job included 3-ft. shoulders and minimum 3' x 8' side ditches. A Dumore elevating grader on a Cat 12 motor grader was able to cast most of the shoulder material into place from ditch excavation. Two Cat DW15s and a D8 pusher worked closely with the Dumore to handle material that had to be hauled. Motor graders shaped the earth shoulders which were compacted by a Tampo 13-wheel pneumatic roller with a McCormick WD9 tractor.

Drainage structures were cleaned out and lengthened as this work progressed. A Cat 955 Traxcavator worked the hard-to-get-at areas in cleaning around the structures and opening the channels.

The plan was to keep ditching, shouldering and culvert operation close together to reduce the traffic hazards. Mowing of heavy growth of weeds was the initial step in shoulder grading. A Ford wheel tractor with rotary power was used, and cuttings either burned or scattered along the ditch bottom to rot.

Important details for this farm-to-market road: all farm entrances and intersecting roads were paved at least 24 ft. out from the shoulder, and a paved turn-out was provided at all mail boxes.

Hot Plant Mix Specifications

Aggregate: a single screened material with silica mineral filler added, meeting the following gradation:

Screen Size	Retained Percentage
1 in.	0.0
⅜ in.	1 to 20
No. 8	15 to 40
No. 200	85 to 92

Maximum allowable screen spread: There shall not be more than 25 percent of material between any two successive sieves in the total series (1½", ¾", ⅜" 4, 8, 16, 30, 50, 100).

Bituminous materials: AC 7 - 5½ to 6 percent in base; 7½ percent in top lift. AC 7 was also used for all tack coating of old pavement and between courses.

24 ft. finished pavement was sealed using AC 7 and Kansas specification CM 4 as chips.

Compaction: Kansas MR 90 supplemental specification.

Asphalt Institute Creates Road Test Study Board

Improved design for multi-layered asphalt pavement structures, long sought by the road construction industry, may well result from the efforts of a newly created Asphalt Institute Board of Study.

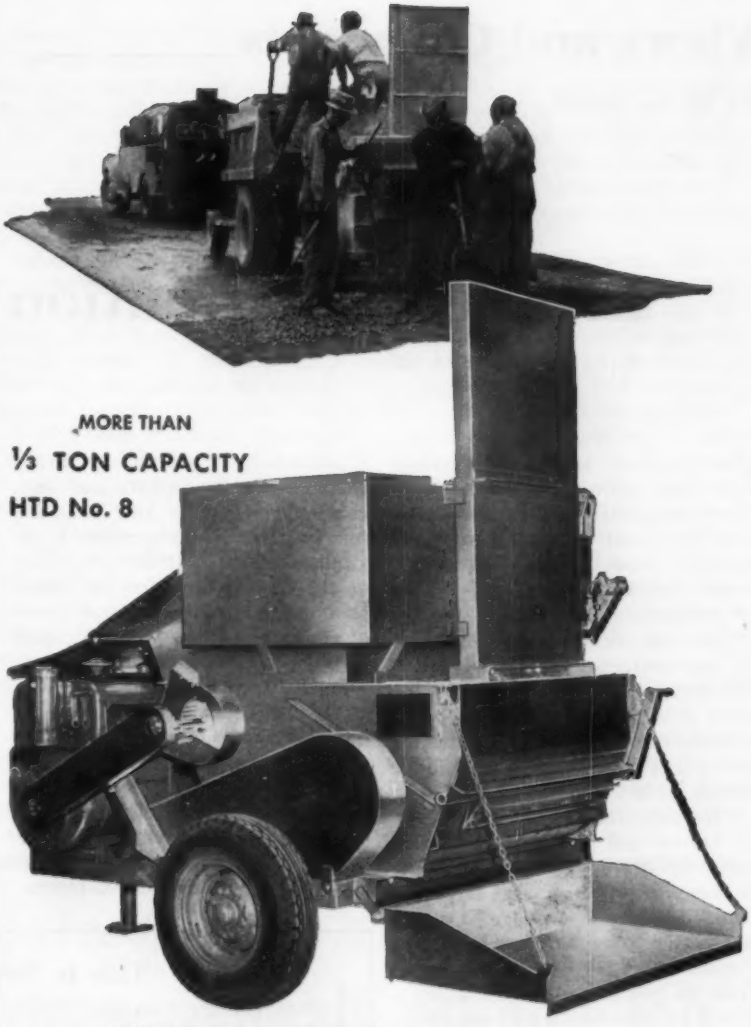
This Board was established to bring together a decade's accumulation of major test road data, and to evaluate these data with the view of finding improved design for asphalt pavement structures. Information will be drawn from such major test roads as the current AASHO Road Test, Ottawa, Illinois; the 1955 WASHO Road Test; two British test roads, and others.

Member Companies of The Asphalt Institute voted to appropriate an estimated $325,000 for the Study. Included in the program also will be an International Conference on Asphalt Pavement Structures in 1962.

The Board is headed by Fred N. Finn, Institute AASHO Road Test Project Engineer. Mr. Finn will have a staff of statisticians, engineers, technicians, consultants and asphalt technologists. The Board also will work closely with the AASHO Committee on Design, technical personnel from the Bureau of Public Roads, and various state design engineers. Office space for the Study group is now being prepared at Headquarters.

Assisting this group in an advisory capacity will be a Road Test Study Steering Committee composed of these Member Company technologists: Messrs. Norman W. McLeod, Imperial Oil Ltd., Toronto; Vaughn R. Smith, American Bitumuls & Asphalt Co., San Francisco; J. O. Izatt, Shell Oil Co., New York; George H. Beddoe, Ashland Oil & Refining Co., Ashland, Ky.; Roland Vokac, Husky Oil Co., Cody, Wyo.; D. W. Gagle, Phillips Petroleum Co., Bartlesville, Okla.; and John W. Griffith, Engineer of Research, The Asphalt Institute.

The Board of Study will publish a series of reports, some aimed at engineers and concerned with theoretical aspects, and others semi-technical for circulation among highway users.



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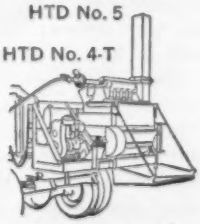
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Views and Comments

By H. G. Nevitt

Increasing Attention to Filler

Few highway engineers or contractors will maintain that filler—its type, quantity, or control—presents any great problem. In fact, in many areas the fines naturally present are simply accepted without addition or subtraction.

Yet to the technologist searching for improvements, even if small, filler seems to offer excellent prospects. A number of such small betterments can add up to an impressive total of lower costs, better functioning, or both.

A few facts about filler are generally known and agreed upon. But how it functions, the exact reasons for these known facts, and the application of this knowledge to produce better pavements, are matters of controversy among the experts. While no two perhaps think alike, the experts can be divided roughly into two groups—the proponents of the mortar theory, and those believing that the filler functions exactly as do the intermediate fractions in filling up the interstices in the mix to give more or better particle contact and consequently increased stability.

According to the mortar theory, the asphalt almost immediately takes up the fine fraction in the mixing operation to form a mastic or mortar, which then serves to cement the coarser aggregate fractions together and affects the overall properties of the completed pavement. We have never heard what the believer in this theory thinks is the line of demarkation—i.e., the size of particle which differentiates those functioning as part of the bonding mortar and those bonded by it. But presumably this size is somewhere in the neighborhood of the 200-mesh screen.

According to the mortar theory this mixture of asphalt and fines coats the aggregate and gives the mix its particular properties. It obviously follows that the properties of the mortar are then the determining properties rather than those of the ingredients (asphalt and fines) which make up the mortar—or, at least, that these mortar properties are likewise critical.

This leads to one of two further corollaries—either the ratio of asphalt to fines must be held to some range, and the mortar characteristics in this range must suit the need; or the asphalt-to-fines ratio must be set by these desired mortar characteristics. The properties given the mortar by the fines are obviously important according to this theory; the practical conclusion, for typical mixes, is that the filler must not be too "active"—that is, too rapidly increase the consistency and change the asphalt properties—or the mortar resulting from a sufficient filler content to keep the voids reasonably low will be unsuitable. This favors limestone dust as compared to celite, to name two well known potential fillers.

The other idea—which might be called the void or void filling theory—is that the filler simply functions like all the other aggre-

This is Nevitt's 100th

This month's discussion by H. G. Nevitt is something of a milestone. It's the hundredth article to appear on these pages since the "Views and Comments" series was initiated back in 1952.

During this time Nevitt's reader following has grown. Today through his broad contacts and his writings his reputation as a basic thinker in the bituminous highway field is national and international. His position in the profession is possibly best shown by his having been honored with the presidency of the Association of Asphalt Paving Technologists two years back. Presently in his role of a top-advisory consultant he spends time in Latin American countries as well as on assignments in the United States.

Nevitt's influence dates back to earlier years, when he first came to the forefront as midwest asphalt manager for Socony Vacuum. In that capacity he was an organizer and guiding spirit in the famed prewar Montana Bituminous Conferences and in the promotion of the then-new Low-Cost Road concept.

Nevitt's chief purpose in these articles has been to stimulate thinking and contribute to the reader's professional development, rather than to merely set forth pat answers when there probably aren't any.

The Editors invite readers to comment on his ideas, which are sometimes controversial perhaps, often provocative, but always beamed toward fundamental problems. Address the Editor, Roads and Streets, 22 W. Maple St., Chicago 10, Ill., or if you prefer, his home at 321 Ward Parkway, Kansas City, Missouri.

gate fractions in a dense graded mix, the fines increase the mix's functional and cohesive properties due to the great number of additional points of contact added.

The proponents of this theory will admit that extremely fine material particles—say below the 325-mesh screen—might function with the liquid. But they argue that the amount of that material present—unless deleterious clay is permitted in the aggregate in appreciable quantity—is usually negligible and does not greatly affect the asphalt properties.

The amount of normal filler should therefore be set by the void space provided by the larger aggregate fractions (after compaction). This is with due allowances for the fact that, as such filler is increased, the asphalt required to coat the filler alone is increased. This also assumes that the volume available for filler is considerably less than that left after deducting (a) the volume of asphalt needed to coat the coarser aggregate and (b) the amount of voids required for safety against overfilling. Admittedly there will be a mortar existing for a portion of the mixing period—the far greater number of fine particles, and their tremendously larger surface area, make certain that the greater part of the fines will be contacted by the asphalt first. But there is no evidence that the characteristics of this mortar affect the mixing operation.

As was brought out in discussion some years back, it is difficult to describe or conceive of this film of asphalt as a homogeneously functioning mortar. If the asphalt is uniformly spread over the coarser particles it will consist of a very thin film from which the filler particles whose diameter will normally be twice (or more) the thickness of the asphalt film—will stick up. This situation hardly meets the concept for morter.

The difference in viewpoint between the two theories is now becoming important in view of the proposals to improve asphalt mixes by the use of special fillers. Short fibre asbestos is a typical one: papers reporting on its use were presented at both the Highway Research Board and the Association of Asphalt Paving Technologists this year. These papers discuss laboratory studies which indicate that this filler would give higher stability, and perhaps permit the use of more asphalt in the mix without flushing; but by the mortar theory such an "active" product would increase the mortar consistency excessively.

In our view the mortar theory stands unproven, and very much in doubt. This does not mean that the filler characteristics can be ignored; the filler's properties—particularly its asphalt demand, and its volume characteristics—must be given due consideration in designing the mix. What should tell the story is the nature of the finished mix. And the procedure advocated by Vokac many years ago for designing mixes is still sound: i.e., that of varying both the filler amount and the asphalt content independently, and noting the effect on the mix characteristics.

There is of course better understanding today of what these mix characteristics should be. In addition to stability the films should not be too thin. The mix should have the lowest possible voids consistent

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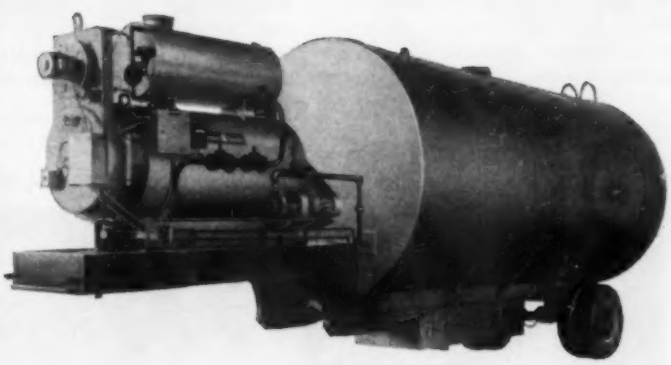

This packaged unit is available with capacities of 10,000, 15,000 and 20,000 gallons. 300-gallon fuel tank for heater. Total weight: 22,500 lbs. with 10,000-gallon tank and CPT-8 Peak-Temp oil heater.

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ORIGINATOR AND LARGEST PRODUCER OF PACKAGED BOILERS

. . . for more details circle 287 on enclosed return postal card

with ability to take the expected traffic without any tendency to lose stability, flush or similar, and so on. But the proper filler type and amount are that which will make the best pavement.

As a means of detecting changes in the mix or its ingredients, perhaps for control for any particular mix design, tests on the mortar, the asphalt-filler ratio, etc., may have real merit; but these tests are merely auxiliary utilizations which should not be confused with design criteria.

We predict that fillers will receive increasing attention, and that better selection, control and field handling of the fine fraction will lead to worthwhile improvements in asphaltic mats which can be reflected in the design requirements.

Teachers Attend Asphalt Graduate Course

The Asphalt Institute early this year granted $20,000 to the University of Minnesota to carry out a summer program in highway engineering, specifically designed for the needs of engineering teachers. Eighteen teachers enrolled for the 1960 summer's six-week session. The curriculum which covered topics in asphalt paving technology and construction consisted of two lecture-laboratory courses (carrying graduate credit) a series of special lectures by practicing engineers, and several field trips.

The program was supervised by M. S. Kersten, professor of civil engineering, assisted by associate professor T. W. Thomas and Lyle Pederson, instructor in civil engineering. Some of the details:

Course CE 151A, Highway Materials. Four lecture periods plus two laboratory sessions per week. Lecture topics: (1) Aggregates; properties and testing. (2) Asphalt; composition and properties, testing, liquid materials, adhesion and durability. (3) Bituminous mixtures; types, gradation, surface area, film thickness, voids computation, compaction, and stability tests. (4) Pavement construction; prime coats, tack coats, seal coats, and pavement durability. (5) Annual costs; (6) Laboratory experiments on aggregate specific gravity, absorption of water and asphalt. (7) Asphalt penetration, ductility, and spot test. (8) Soil stabilization; intermediate type mixtures. (9) Marshall test; compression and triaxial testing. (10) adhesion tests; extraction and recovery of asphalts. (11) Coaxial cylinder and thin film viscosity.

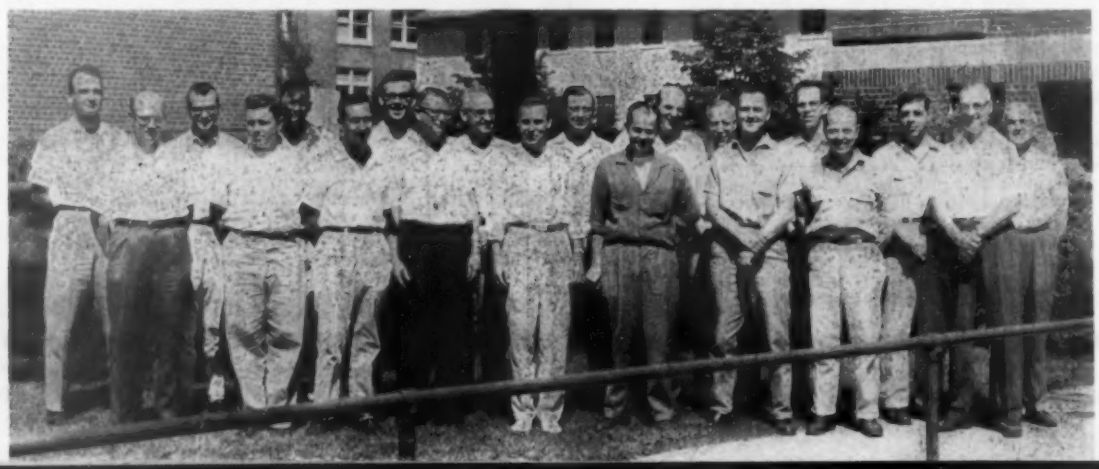
Course CE 153. Soils in Highway Engineering. Four lectures and one laboratory period per week. Subjects: (1) Texture, identification tests, maps, classification, frost action and penetration calculations. (2) Compaction, bearing tests, flexible pavement design methods, and airfield pavements. (3) Laboratory experiments on moisture-density, swell, stabilometer, sand equivalent, unconfined compression, and hydrometer analysis.

Guest lecturers gave discussions and seminars on subjects in which the speakers are recognized as being prominent in their fields. Lecturers included Charles R. Foster, Coordinator of Research, National Bituminous Concrete Association; John Griffith, Engineer of Research, The Asphalt Institute; J. C. Johnson, Staff Engineer, The Asphalt Institute; L. C. Krchma, Assistant Regional Manager, Asphalt Department, Socony-Mobil Oil Company (Kansas City, Mo.); Norman W. McLeod, Asphalt Technologist, Imperial Oil Company, (Toronto, Ontario); and J. A. Murchie, Bituminous Engineer, Minnesota Highway Department.

Field inspection trips were scheduled to refineries, an emulsion plant, asphalt paving plants, equipment manufacturers, and various types of bituminous construction projects.

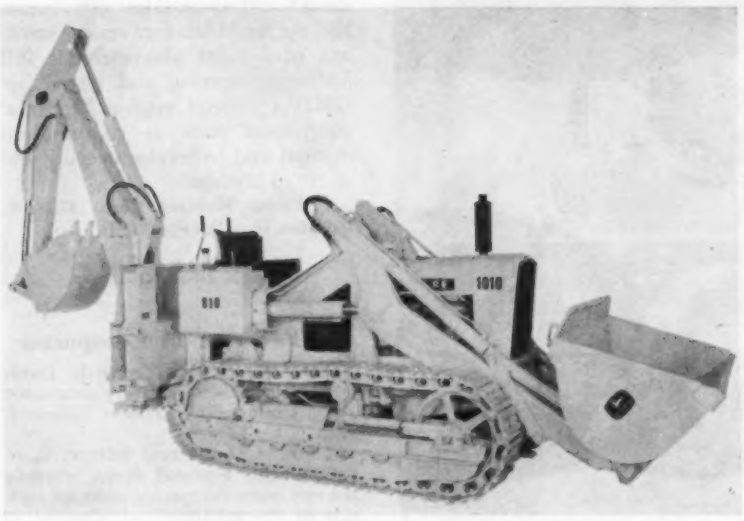
Six graduate quarter credits were earned by those who were admitted to the graduate school. Candidates for the Ph. D. in another recognized graduate school were admitted as transient graduate students. Each participant was given grant-in-aid of $725. Tuition for the course was $69 plus a small incidental fee covering university services. Students weren't charged for transportation on field trips.

Unique summer class of civil engineering teachers, gathered at Minneapolis for The Asphalt Institutes' bituminous course.



NEW PRODUCTS

Listed here are reviews of new and improved equipment items, selected to aid our readers in purchasing. See reader service numbers on enclosed postcard.*



1. Deere 1010 Crawler Loader with Backhoe

Deere Announced Broad New Tractor Line

Recently developed equipment for earthmoving, logging and material handling in new power ranges was announced by the John Deere Co., Moline, Ill., at a worldwide dealer meeting held in Dallas, Texas. The new completely redesigned units will comprise the largest selection and include the largest power sizes ever offered by the company.

Two crawler tractor series will be manufactured in 40 and 50 engine hp. sizes.

Wheel tractors, also announced at Dallas, will include four models of 40, 50, 60 and 85 engine hp.

All the tractors have power-matched equipment and feature new variable-speed engines. The four and six cylinder valve-in-head engines will operate at speeds up to 2500 rpm. providing the advantages of constant efficiency throughout the full throttle range. Gasoline or diesel options will be offered throughout the line.

New hydraulic controls to increase work output and work quality through simplified earthmoving equipment operation are included on the new line. On the crawler-loader units, a single lever controls all movements of both the loader lift arms and the bucket, the manufacturer reports. A new T-bar, provided on both crawlers, a control for all-hydraulic bulldozers, will command all four operating functions.

2. John Deere Wheel Tractor

John Deere equipment for this series includes backhoes, loaders, bulldozers, mowers and specialized tools such as a telephone cable plow.

Deere & Co., Moline, Ill.

For more details circle 101 on Enclosed Return Postal Card.

35 Ton Level Deck Trailer

Using USS T-1 high strength steel, Talbert Trailer Co. has designed and produced a 35 ton capacity level deck trailer weighing only 10,050 lbs.

Designated Model T3L-35-FG-1-T-1, the trailer has rubber mounted three axle spring suspension, tubular axles, air brakes with S cam and 12 volt ICC lights and reflectors.

Talbert 35 Ton Trailer

Talbert Trailers, 7950 W. 47th St., Lyons, Ill.

For more details circle 102 on Enclosed Return Postal Card.

Portable Drafting Kit

A complete portable drafting kit containing 14 pieces was recently announced available from Retake, Inc.

Drafting Kit—Portable

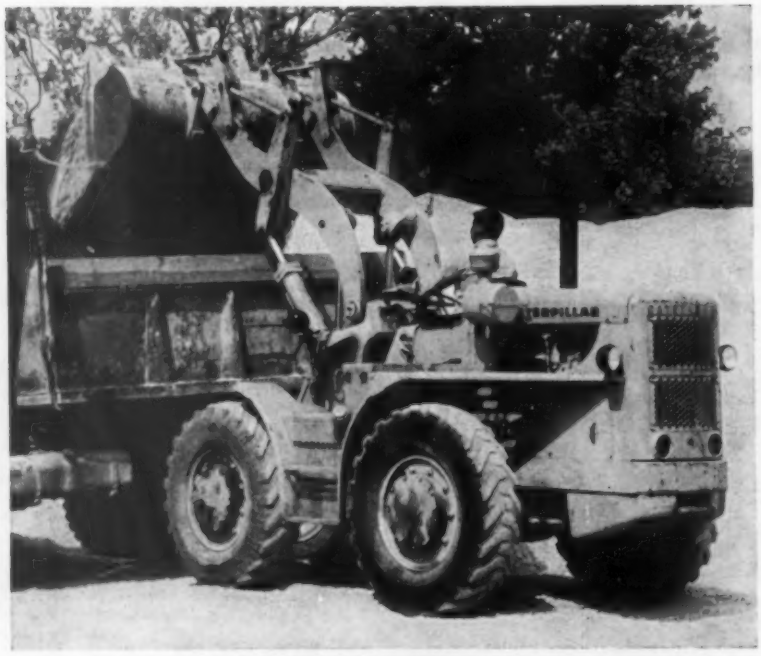
The combination unit features drawing board, T-square, triangle and protractor in sturdy vinyl covered attaché case.

Retake, Inc., P. O. Box 5336, Pasadena 8, Calif.

For more details circle 103 on Enclosed Return Postal Card.

*To readers outside of the United States—postal rules forbid use of business reply cards outside of the U.S. Please write to us listing the numbers, month and name of magazine, and mail with your name and address to Inquiry Dept., Roads and Streets, 22 W. Maple St., Chicago 10, Ill., U.S.A.

New Products



1¼ yd. Traxcavator--Diesel or Gasoline

80 hp Traxcavator

The third in a line of wheel Traxcavators to be introduced this season, the 80 hp. unit is now available, Caterpillar announced.

Designated the 922, it resembles the two larger machines previously announced. It has a 1¼ yd. bucket and is powered by either a gasoline or diesel engine. Featured is the open and accessible operator's compartment and the location of all loader mechanism completely ahead of the operator's compartment.

With a maximum lift capability of 12 ft. 2 in. and a dumping reach of 25¾ in., it has a breakout force of 13,700 lbs. Powered by D320 four cylinder engine that has a maximum of 105 hp., the diesel unit has a 24 volt system. The six cylinder gas engine has a 12 volt direct electrical system. Power train of the 922 includes a two-speed power shift transmission, a torque converter, auxiliary transmission and a planetary final drive. The high-low speed range gives the wheel Traxcavator four speeds in either forward or reverse. The machine has three brake pedals, one of which not only stops the machine, but automatically puts the transmission in neutral.

Caterpillar Tractor Co., Peoria, Ill.

For more details circle 104 on Enclosed Return Postal Card.

Motor Graders

A new model motor grader featuring planetary axles, four wheel drive and four wheel steer and brakes has been introduced by the Pettibone New York Div. of Pettibone Mulliken Corp.

Designated the Model 502, it is equipped with a power shift transmission which gives four forward speeds up to 19.1 mph and four reverse speeds up to 23.5 mph. The combination of the torque converter and planetary axle reduction at the wheel hubs helps to absorb shocks and eliminates axle breakage, the manufacturer states. Standard equipment also includes full hydraulic steering and a 106 hp. GMD 3-7 diesel engine. Optional equipment such as combination manual and hydraulic steering and 12 or 16-plytires.

Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill.

For more details circle 105 on Enclosed Return Postal Card.

New Features in Compactor

Two new features recently incorporated into their vibratory compactor was announced by Jackson Vibrators, Inc.

The first of the new features is an hydraulically actuated device whereby the two outer compactor units on each side of the workhead are elevated to the vertical position to provide an over-all width of 88 in. for normal traveling from job to job. In normal working arrangement the workhead consists of six vibratory units, each providing 4200 three ton blows per minute with a total coverage of 13 ft. 3 in.

The second of the new features is the widening attachment for towing the required compactor units at the side of the compactor. This is equipped with an hydraulic device that instantly lowers and lifts the units to and from the area to be compacted.

Jackson Vibrators, Inc., Ludington, Mich.

For more details circle 106 on Enclosed Return Postal Card.

Motor Grader

HC-77 Truck Crane—22½ Ton Capacity

Truck-Crane

Just introduced to the 25-ton truck crane market is Link Belt Speeder's new HC-77 Zephyrcrane.

A working weight of approximately 56,000 lb. and an 8 ft. overall width, combine to make legal highway travel possible in most areas without major stripping, the manufacturer reports. The counterweight, both front and rear double-box outriggers and the full width sliding beams are removable. Other features available on the carrier are power steering, screw-type outrigger jacks and lightweight pontoons and a completely independent emergency brake system. Individual standard and optional features of the upper include Speed-O-Matic power hydraulic controls, power load-lowering clutches, independent high-low speed boomhoist with clutches for power up or down and a third drum limiting device. Literature on the new product is also available from the manufacturer.

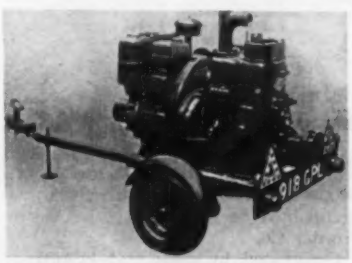
Link-Belt Speeder Corp., 1201 Sixth St. S. W., Cedar Rapids, Iowa

For more details circle 107 on Enclosed Return Postal Card.

Trailer-Mounted Pump

A new trailer mounted version of a standard UVS2 Univac pump has been introduced by Henry Sykes Ltd.

The UVS2 is a 3/3.5 hp. diesel powered self-priming centrifugal pump which incorporates a rotary vacuum pump in its designing. The impeller is of the 3 blade type and is of cast iron. The output of the pump at 1500



Trailer Mounted Pump

rpm. is 8,000 gph. A rigid bedplate has been fitted for the new trailer mounting, allowing the pump to be detached and manhandled into confined spaces. The suspension of the trailer unit is by means of independent rubber torsion bars and the wheels are fitted with 16 in. by 4 in. tires. The trailer has rubber fenders.

Henry Sykes Ltd., 53B Southwark St., London, S. E. 1, England

For more details circle 108 on Enclosed Return Postal Card.

REPLACE AND SAVE WITH . . .

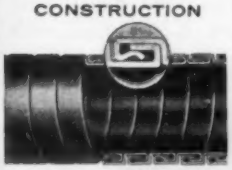
Flexonics

Free-Flowing

TAR & ASPHALT HOSE

- Heat-Proof
- Leak-Proof
- ¾" up to 12" I.D.
- Hose & Fittings to meet all equipment needs.

SUPER STRENGTH
FOUR WALL
CONSTRUCTION



Asbestos packed, interlocked construction . . . provides maximum flexibility.

IH 375

USED AS ORIGINAL EQUIPMENT

FLEXONICS CORPORATION
1423 S. 3rd Ave., Maywood, Ill.
Subsidiary of Calumet & Hecla, Inc.
Send me complete T&A hose data and name of distributor nearest me.

Name_____
Company_____
Address_____
City_____ Zone____ State_____

. . . for more details circle 298 on enclosed return postal card

Model 931—6 Cummins Engines

New Diesel Series

A new diesel truck with gross vehicle weights going as high as 60,000 lb. was recently announced by Diamond T Motor Truck Co.

The new diesel unit, the 931 series, is equipped with the "D" cab as standard equipment. The cab is 72 in. wide and built of girder-type construction, with a welded steel frame. A choice of 6 Cummins diesel engines are available. The six motors cover horsepower from 220 to 320. Two front axle positions and 11 main transmissions are also available. The model 931 is also built in a six wheel model and a lightweight aluminum body. The new series is now in full production.

Diamond T Motor Truck Co., 4401 W. 26th St., Chicago 23, Ill.

For more details circle 109 on Enclosed Return Postal Card.

Crawler Cranes

Addition of five new models to its distributor-size machine line has been announced by Marion Power Shovel Co. They range in ratings from 30 to 75 tons, and in shovel capacity from 1¼ to 1¾ yd.

Crawler Shovel

Designating the new models 45-M, 47-M, 65-M, 75-M and 77-M, the company states that some of the new features are designed to improve and diversify machine usefulness as cranes, while others will have special significance for dragline, hoe, and shovel use. Power load lowering, third drum, independent boomhoist, independent travel, torque converters and multiple speed transmissions are among the accessories available. Crane models include capacities of 30, 40, 50, 60, and 75 tons, with boom and jib maximum combinations from 115 to 200 ft.

Marion Power Shovel Co., Div. of Universal Marion Corp., Marion, Ohio

For more details circle 110 on Enclosed Return Postal Card.

Primers for Ammonium Nitrate

Three compact primers for safe, economical initiation of low grade ammonium nitrates and other blasting agents have been announced by Austin Powder Co.

Designated by color and known as Austin Red Cap, Blue Cap and Black Cap, primers are said to be unaffected by water and completely insensitive to shock and abrasion with rifle impact sensitivity of zero. As a result, holes can be loaded as soon as drilled when primers are used with a detonation fuse. If incomplete detonation of a blast should occur because of improper connections, primers can be more safely dug out.

Red Cap and Black Cap are reputed to be equivalent to regular 30 lb. dynamite primers although they weigh only

Austin Primers

13 oz. apiece and are no larger than the palm of a man's hand. The 8 oz. Blue Cap is for small diameter holes.

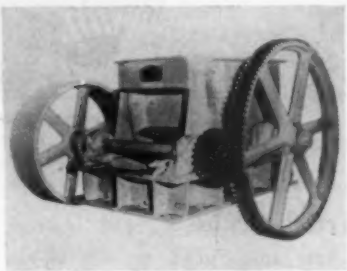
Austin Powder Co., Cleveland 13, Ohio.

For more details circle 111 on Enclosed Return Postal Card.

Single-Roll Crusher

A new single-roll crusher incorporating several design features previously developed was announced by the Pennsylvania Crusher Div. of Bath Iron Works.

Used as primary or secondary crusher in continuous production lines, the



Single-Roll Crusher

Atlas reduces product size to maximum dimensions of 1½ to 8 in. It is available with roller diameters of 18, 24, or 30 in. to handle feeds up to 26 in. thick. Various models will crush from 40 to 660 tons per hr. and require from 20 to 200 hp. Featured on the new crusher is a contoured breaker plate to take the large feed sizes without clogging, simple adjustment of breaker plate by shims to set product size, reports the manufacturer. Bearings are protected from dust and dirt by seals on the frame.

Pennsylvania Crusher Div. of Bath Iron Works, West Chester, Pa.

For more details circle 112 on Enclosed Return Postal Card.

Crawler Crane Model

A new 80 ton crawler crane, model 880, has been introduced by the Thew Shovel Co.

Featured on the new Lorain is the crawler side frames, which may be removed by screwing retractable telescopic axles into the body. Tread belts and drive chains are left intact on their frames. This, the manufacturer states, makes shipping simple and saves field assembly and dissassembly time. Turntables are handled by tow lever "joy

sticks". Two independent travel speeds in both directions are coupled with a "Shear-Ball" turntable connection for added features. The rig is equipped

Crawler Crane Model 88o

with air power controls for crawler travel, steering and tread-travel locking pawls. Track rollers are protected by neoprene bellows type seals. Crawler tread belts are available in 34 to 48 in. widths.

Thew Shovel Co., Lorain, Ohio

For more details circle 113 on Enclosed Return Postal Card.

Pushin'-Cushin'

Damaging shock to expensive earth moving equipment can be eliminated with the mounting of a Pushin'-Cushin' on any D-8 or D-9 Caterpillar tractor.

The genius behind the device is an automatic self-contained hydraulic cylinder, operating without pumps or hoses. The multiple action cushion of the hydraulic cylinder allows the pusher tractor the freedom of shifting up or down without shock, the manufacturer reports. The push-block snaps out as the scraper pulls away and cushions back as the pusher picks up the scraper on the move. A rear-mounted push-block is also available for tandem pushing.

Pushin'-Cushion', Inc., Box 207, Perry, Kansas

For more details circle 114 on Enclosed Return Postal Card.

Push-Block

Cement Bleeding Test

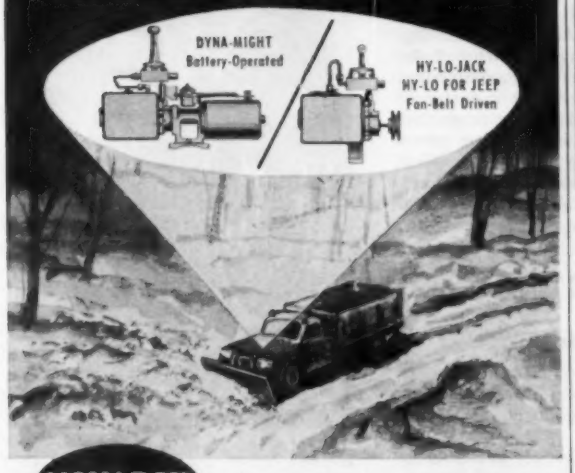
A test apparatus for determining the bleeding rate and bleeding capacity of cement paste and mortar is available from Soiltest, Inc., Chicago for use in testing and research.

Designated the CT-12, the bleeding apparatus makes possible a direct and continuous reading of the bleeding rate of the test material. The test conforms with the American Society of Testing Materials test procedure. Components of the device are: container for the test paste or mortar; a collecting ring; a measuring burette with funnel; and a support.

Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.

For more details circle 115 on Enclosed Return Postal Card.

PERFORMS WITH EASE!



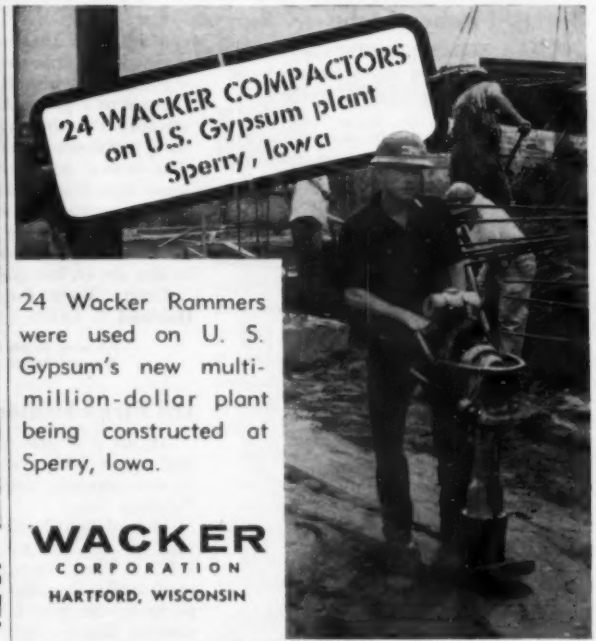
MONARCH power hydraulic controls lift and lower snow plows automatically!

Be sure your equipment is equipped with Monarch units — makes snow removal jobs faster, easier, more economical. One man controls the plow right from the cab . . . instant up-and-down action with the flick of a wrist. A Monarch control can be quickly installed. See your dealer. *Send for free folder today.*

MONARCH ROAD MACHINERY COMPANY
1331 Michigan St., N.E. Grand Rapids 3, Michigan, U.S.A.

. . . for more details circle 326 on enclosed return postal card

24 WACKER COMPACTORS on U.S. Gypsum plant Sperry, Iowa



24 Wacker Rammers were used on U. S. Gypsum's new multi-million-dollar plant being constructed at Sperry, Iowa.

WACKER CORPORATION
HARTFORD, WISCONSIN

RS-10

Gentlemen:
Please send me free descriptive literature and the name of your nearest dealer.

Name .....
Address .....
City ..... Zone .... State .....

WACKER

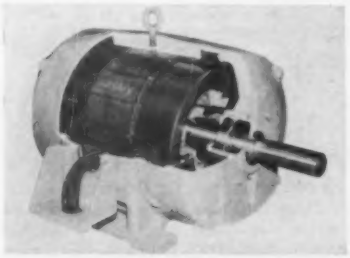
. . . for more details circle 347 on enclosed return postal card

New Products

Encapsulated Motors

A new line of encapsulated motors, 3 or 2 phase, 1 through 125 hp. a.c. squirrel-cage, has been announced by Howell Electric Motor Co.

The machines are said to be Howell-sealed, which, according to the manufacturer, is a specially-developed epoxy compound applied under vacuum to surround each wire in slots and at coil ends to produce a solid, void-free mass. The new motors are said to perform in applications usually requiring enclosed motors because of exposure to excessive heat, moisture, acid and the like.



Encapsulated Motors

Howell Electric Motors Co., Howell, Mich.

For more details circle 116 on Enclosed Return Postal Card.

Safety Flasher Light

A new lens, reportedly capable of withstanding heavy blows from a hammer has been developed by Selecto-Flash, Inc.

Installed in all virgin plastic frames, the 7 in. red or amber lens contains an inhibitor to prevent discoloration or crazing. The frame allows for 360 deg. visibility. The units are powered by transistorized power paks with or without push button control of flash duration. A 6 volt, 8 cell battery and a G. E. bulb are used. Literature is also available.

Safety Flasher Light

Selecto-Flash, Inc., East Orange, N. J.

For more details circle 117 on Enclosed Return Postal Card.

Hydraulic Derrick

A new versatile hydraulic derrick built by Utility Body Co. is now reported available for either front or rear mounting.

Some features are: side; fore and aft; and up and down movements; allowing it to reach nine ft. to either side from center line of the truck chassis. This, the manufacturer states, makes it possible to park parallel with the curb and plumb any pole without the use of a pike. Adjustable side legs simplify the digging of anchor holes with minimum of truck meneuvering. The device has a lifting capacity of from 2500 lbs. with sheave at ground level to 12,500 lbs. at maximum elevation. Each side leg cylinder is operated by a separate valve and these cylinders are an integral part of each leg.

Utility Hydraulic Derrick

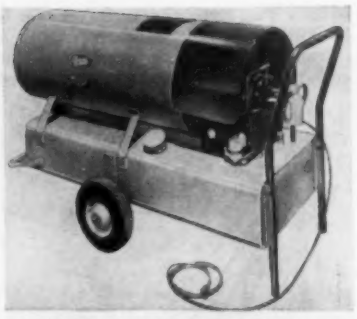
Utility Body Co., 1530 Wood St., Oakland 7, Calif.

For more details circle 118 on Enclosed Return Postal Card.

Oil Fired Heaters

An all new line of oil fired heaters and a new LPG and natural gas heater was recently announced by Aeroil Products Co.

The oil fired heaters are available in sizes of: 125,000; 250,000; and 500,000 BTU. They feature stainless steel combustion chambers and all sizes are portable on wheels. Equipped with positive displacement fuel pumps and fuel filters, two of the larger models also have thermostats. Fuel tanks are said to hold sufficient fuel to run the heater for 16 hrs. Model HE-SG-200 is fired by LPG gas and has an output of 200,000 BTU. It weighs 45 lb., comes with a carrying handle and is equipped with a thermostat as standard equipment. A safety control is provided to shut off gas supply in the event of power failure or pilot light failure. The unit is also available for burning natural gas.



Aeroil Portable Space Heater

Aeroil Products Co., Inc., 9 Wesley St., South Hackensack, N. J.

For more details circle 119 on Enclosed Return Postal Card.

Equipment Solid Tires

A new kind of off-the-road tire, the grizzley may be used on fork trucks, front dumps, truck cranes and similar equipment, has been announced by the Bearcat Tire Co.

Made of a material consisting of virgin rubber and nylon, the manufacturer states that only two light, flexible wire bands are required for reinforcement. Said to give a pneumatic-like ride to protect equipment from shock, the tire is puncture, cut and abrasionproof, helping to eliminate down time. The new tire will fit all standard pneumatic rims of all popular makes of equipment.

Off-the-Road Solid Tire

Bear Cat Tire Co., 442 W. Garfield Blvd., Chicago 9, Ill.

For more details circle 120 on Enclosed Return Postal Card.

Quick Release Pins

A new line of quick release pins that eliminate the need for cotter pins, locknuts, etc., was recently announced by Waldick Engineering Co.

Designated the Eco-Pins, they are reportedly designed with extra-large stainless steel lock buttons, activated by siliconized rubber, which will hold against vibration even in oversized holes. Alignment is made easy by a solid tapered end. The pins are available in sizes from ¼ in. and up, in stainless steel, naval bronze or plated steel. The manufacturer states that the pins can be used as clevis pins, chain and anchor shackle pins, safety lock pins or shear load pins.

Quick Release Pins

Waldick Eng. Co., P. O. Box 398, Huntington Station, Long Island, New York

For more details circle 121 on Enclosed Return Postal Card.

Short Wheelbase Trucks

A new series of short wheelbase, rear powered, light duty trucks has been introduced by Chevrolet.

Designated the Corvair 95, the new line is designed for maximum utility of cargo space and load capacity in relation to overall dimension and weight. With a 95 in. wheelbase and short overall length of less than 15 ft., it has a short turning radius and is highly maneuverable.

Comprising a panel delivery and two pickup models, one of the pickup models has a unique, swing-down, side-loading ramp. The new series is powered by the 80 hp. air-cooled Corvair six-cylinder engine and transaxle power unit mounted at the rear. The cab location at the extreme front of the vehicle affords visibility as well as good maneuverability. A direct air heater uses engine heat to warm the cab.

Chevy's Side-loading Truck

Chevrolet Motor Div., General Motors Bldg., Detroit 2, Mich.

For more details circle 122 on Enclosed Return Postal Card.

Concrete Roller

A new concrete roller manufactured by Stow Mfg. Co. has recently been introduced to the market.

Rolling the cylindrical screen back and forth across the slab after it has been rodded pushes down the aggregate and brings the wet mortar to the surface for easier, faster finishing. It is reported to be ideal on slabs of 3 in. to 6. in. slump. The concrete roller prepares the surface for machine troweling and often is used to save slabs that would otherwise probably get away.

Stow Concrete Roller

The roller provides a means of putting non-skid surfaces on concrete loading ramps or other surfaces for safety, leaving a diamond-shaped pattern in the concrete surface. The roller is 15 in. in dia., 24 in. long, has a 10 ft. handle and weighs 40 lbs.

Stow Mfg. Co., 443 State St., Binghamton, N. Y.

For more details circle 123 on Enclosed Return Postal Card.

Chain Saws

Two improved chain saw models with a full line of match-mated attachments have been introduced by Pioneer Chain Saws.

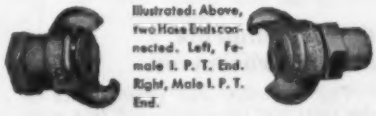
Featured in the new line are the all-new compact high-production model 410, for pulpwood cutting, falling, bucking and trimming; and the new professional model 610, a heavy-duty chain saw engineered to meet the de-

Pioneer Chain Saw 610

"AIR KING"
Quick-Acting, Universal
HOSE COUPLING

FOR COMPRESSORS, ALL TYPES OF AIR TOOLS, WATER, OIL AND SPRAY SERVICE

This versatile coupling is built along plain, rugged lines to assure long, trouble-free service under severest working conditions.



Illustrated: Above, two Hose Ends connected. Left, Female I. P. T. End. Right, Male I. P. T. End.

The "Air King" will reduce operating costs wherever quick connections are required. Locking heads are identical for all sizes of hose or threaded ends, permitting the coupling of any two sizes of hose within the "Air King" hose end size range, or coupling to any pipe up to 1" by use of the male or female threaded ends. Heads are locked by pressing together and applying a quarter-turn. A patented Safety Locking Device eliminates all risk of the coupling coming apart. Available in bronze or rustproofed malleable iron, in sizes up to 1".

The "Air King" is made to established standards for couplings of this type and is interchangeable with other similar makes.

Also available in 4-Lug style, Hose and Female I.P.T. Ends only, in 1¼", 1½" and 2" sizes.

DIXON
Valve & Coupling Co.
EXPORT DEPARTMENT
1010 SCHAFF BLDG.
PHILADELPHIA 2, PA., U.S.A.

. . . for more details circle 292 on enclosed return postal card

mands of professional woodsmen, the company reports. The machine has a 2 stroke, 1 cylinder piston engine ported with torque curve, and features the new Insto-Primer, which injects fuel into the firing chamber with a simple flick of the thumb.

Pioneer Chain Saws, Outboard Marine Corp., Waukegan, Ill.

For more details circle 124 on Enclosed Return Postal Card.

Two-Hammer Portable Plant

A new portable Impact Master plant has been introduced by Universal Engineering Corp. The new plant features a single, two hammer rotor. The plant is mounted on an I—beam, gooseneck frame with tandem axles in the

Two-Hammer Portable Plant

rear and either trucks or fifth wheel available for transportation.

Universal Engineering Corp., 625 C Ave., N.W., Cedar Rapids, Iowa.

For more details circle 125 on Enclosed Return Postal Card.

Cat Attachments and Improvements

The efficiency and performance of the D8H has been increased in a wide range of applications through introduction of special attachments and improvements, according to Caterpillar Tractor Co.

An optional seven roller track frame, intended primarily for use where the machine is operated on severe grades, for dozing a finish grade or where flotation is a problem. To accommodate the additional roller, the idler is nine in. farther forward than on the standard, six roller track frame. Diagonal brace brackets on the No. 8S and 8U bulldozers are moved forward approximately seven in. to provide clearance for the longer frame.

Two new improvements on the standard frame were also announced. Track guiding guards are increased in size and now mount closer to the track, giving more effective guiding action and greater track protection. Distance between the legs of the diagonal brace is increased 18 in. at its junction with the track roller frame, providing additional frame strength.

Caterpillar Tractor Co., Peoria, Ill.

For more details cricle 126 on Enclosed Return Postal Card.

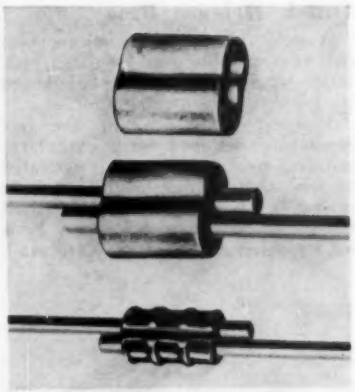
New Connector Speeds Fence Splicing

The tiresome chore of fence splicing can now be eased; a small metal sleeve promises to do the trick. Developed jointly by U. S. Steel's American Steel & Wire Division and The National Telephone Supply Company, the time-saving device is here pictured.

The zinc-coated metal sleeve is shaped like a slightly crimped oval about one-half inch long, the best size varying somewhat according to the gauge of fence wires. To begin splicing two sections of fence, one wire from each section is inserted in the sleeve. With a specially designed crimping tool, the splicing sleeve is compressed. This process forms a tight bond, joining the wires. When all wires of both fence sections have been joined, the splicing is done.

The old laborious method of splicing lengths of fence involves the awkward process of intertwining fence wires.

According to its designers, the new splicing method besides its convenience and ease facilitates use of stronger, more durable medium-hard wire fencing; it makes practical the use of short lengths of fence which might otherwise be discarded; it serves equally well in installing new or repairing old fence; it performs the job equally well



Fence Splicing Sleeve Connector

on woven wire or barbed wire fencing; it is of particular advantage in splicing closely spaced fence line wires; it will not damage wire coating.

The sleeve and a specially designed splicing tool have been placed on the market by The National Telephone Supply Company under the trade name "Nicopress."

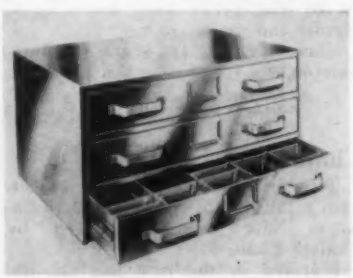
United States Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.

For more details circle 127 on Enclosed Return Postal Card.

Small Parts Cabinet

A heavy duty cabinet designed for storage of small screws, washers, ignition parts and springs, was announced by Bay Products.

Each of the three drawers is subdivided into five compartments 3 in. wide by 11 in. long and these in turn



Small Parts Cabinet

subdivided with cross dividers adjustable on 1 in. centers. Any compartment size required can be made to suit the particular part being stored. Drawers are provided with a labelholder to hold index cards which are furnished with the unit. The cabinet is all steel, 16¾ in. wide, 8¾ in. high and 11¼ in. deep, and comes finished in grey baked enamel.

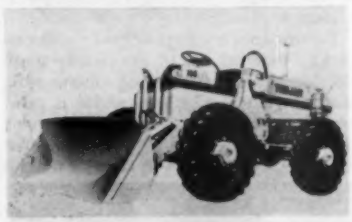
Bay Products Inc., 1801 W. Cambria St., Philadelphia 32, Penn.

For more details circle 128 on Enclosed Return Postal Card.

Tractor Shovel

A new line of tractor shovels are now in production, Trojan Div. of Yale and Towne Mfg. Co. announced recently.

Designated Model 114, the new Trojan machine has a lifting capacity of 6,500 lb. and bucket sizes from 1 to 1⅞ cu. yd. The new unit features power shift transmission, planetary axles and power steering. The rig will travel 25 mph. over roads and has torque proportioning differential axles that permit maximum utilization of power. It is available in both gasoline and diesel. Total weight is approximately 13,000 lb. and the over-all



Tractor Shovel

length is 17 ft. 4 in. Bucket tilt back is 40 deg.

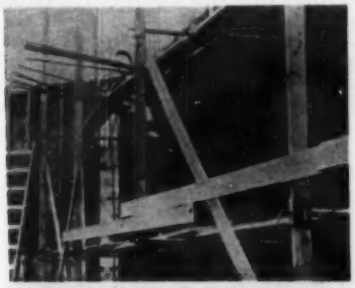
Yale and Towne Mfg. Co., Trojan Div., Batavia, N. Y.

For more details circle 129 on Enclosed Return Postal Card.

Re-Bar Ledger

A new re-bar ledger, designed to make quick scaffolding set-ups for placing reinforcing bars has been developed by Superior Scaffold for use on a wide variety of concrete construction jobs.

Featured is the holding pin which fits inside the end of the 1⅝ in. ledger bar. The pin slips through the shebolt or tie hole in the form and is held



Re-Bar Ledger

in place by a washer and nail on the back side of the form. A vertical 2x4, held securely by a ½ in. lag screw is slipped through the can on the other end of the 4 ft. ledger. Conventional cross bracing is used. Multiple ledgers may be used on a single upright by removing the double-headed nail on the inner form.

Superior Scaffold Co., 5624 Bankfield Ave., Culver City, Calif.

For more details circle 130 on Enclosed Return Postal Card.

Earth Auger

A new AA series 48 in. by 54 in. Pengo earth auger was recently developed and announced by Petersen Engineering Co.

The new auger is available in a full range of sizes in dia. of 24 to 48 in. and 54 in. lengths. These same sizes

Earth Auger

plus a full range of sizes from 54 to 96 in. are available in the twin helix type. Al sizes use the same standard Pengo pilot bit and the new, strong #20A70 reversible forged wisdom tooth. Designed for boring in coral, basalt and other tough materials, it is for use where other types of Pengo augers can't go.

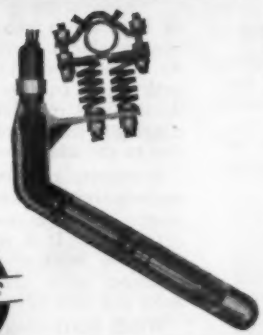
Petersen Engineering Co., Inc., Santa Clara, Calif.

For more details circle 131 on Enclosed Return Postal Card.

CUT CONCRETE COSTS *with*...

MAGINNISS VIBRATOR ATTACHMENTS on Your Paving Machines

MOTOR IN HEAD • PACKED WITH POWER • BUILT TO LAST



Maginniss HI-LECTRIC POWER TOOLS

The powerful 180 cycle Hi-lectric Vibrators in ANGLED or HORIZONTAL position provide thorough internal vibration of any slab regardless of depth. MAGINNISS Vibrators handle the stiffest mixes. Their vibrating action is so efficient and the finished concrete of such high quality that some specifications permit the use of less cement per yard when they are used ($32,000 saving on one job).

SAVE MONEY!

On many jobs, contractors have found that a MAGINNISS Hi-lectric Vibrator Attachment on their finisher eliminates the need of a spreader. Moreover, the vibration is so effective that second passes of the finisher are often unnecessary — still more savings in time, labor, and equipment operating costs.

SAVE MONEY!

You also save with MAGINNISS superior motor-in-head design. Only TWO moving parts — there are no brushes, commutators, gears, flexible shafts or complicated and troublesome air or fluid drive mechanisms. MAGINNISS Vibrators operate hour after hour in hardest service at minimum expense.

SAVE MONEY!

It will pay you to return the coupon today—for more facts.

MAGINNISS POWER TOOL CO.
154 Distl Ave. • Mansfield, Ohio

- ☐ CONCRETE STREET, HIGHWAY, and AIRPORT PAVING VIBRATORS
- ☐ VIBRATORY SCREEDS
- ☐ STRUCTURAL VIBRATORS (180 Cycle Heavy Duty)
- ☐ STRUCTURAL VIBRATORS (AC-DC Light Duty)
- ☐ PENCIL VIBRATORS
- ☐ VIBRATORY SOIL COMPACTORS

MAGINNISS POWER TOOL CO.

Dept. RS-100, Mansfield, Ohio Date_____

Please send me literature on items checked at left.

Individual_____ Title_____

Firm or Dept_____

Street _____

City_____ State_____

. . . for more details circle 324 on enclosed return postal card

Caterpillar Announces Truck Engine

With many years of experience in the diesel engine field, Caterpillar has now started the production of a diesel truck engine. Designated the 1673, the new engine is 220 hp at 2200 rpm. The six-cylinder turbocharged and aftercooled power plant has a 4.5-in. bore and 5.5-in. stroke. Caterpillar estimates that 85 to 90 percent of diesel trucks on the road are in the horsepower class to use the new engine. These trucks would have gross vehicle weights of 26,000 lb. or gross combined weight of 50,000 to 75,000 lb.

Reported to use only .398 lb. of fuel per brake hp-hr., the engine's pre-combustion chamber design is the heart of the economical operation and maintenance. In this chamber part of the injected fuel is ignited, ramming the main charge into the cylinder under high turbulence to mix fuel and air, assuring full burning at all load conditions including idling. The complete burning results in clean exhaust, a smooth power stroke and the use of a fuel injector with a large single orifice.

The large single hole orifice injectors in conjunction with the precombustion chamber permit the use of less expensive, heavier fuels. These economy fuels are claimed to have higher energy values and thereby produce more work per gal. Complete combustion means less smoke and odor during gear shifting, on steep grades, and at cruising speeds. The elimination of smoke means less wasted fuel.

The fuel system features the exclusive precombustion chamber design (left).

The compact Cat 1673 fits almost every truck in its horsepower range. The design is reported to incorporate all the longevity characteristics built into the many Cat diesels now at work.

This new engine is similar to that used in the D6 tractor, No. 14 motor grader and the No. 977 Traxcavator. Caterpillar's four-cycle design allows valves to be open longer. The design also allows a long, effective power stroke and high combustion efficiency. The aluminum alloy bearings are corrosion resistant, important because of corrosive action of acids usually found in engine crankcases. A wear-resistant seat for the critical top ring of the aluminum piston is provided by an integrally-cast iron insert. The piston sides are elliptically ground, to match the cylinder walls during operating conditions.

The engine's full-length water-cooled cylinder liners prevent cracking of liners and dissipate heat for longer piston life. The pistons are oil-cooled by a constant oil spray on the under side of the piston. The forged crankshaft is formed from carbon steel, induction hardened and shot peened for additional surface hardness and stress relief.

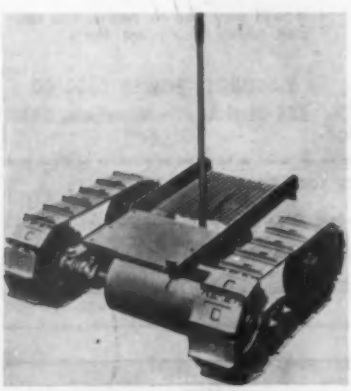
Contractor Greco of Rosemont, Illinois, using a Cat 1673 to repower this Mack B-63.

For more details circle 132 on Enclosed Return Postal Card.

Crawler Mounted Trencher

A new crawler mounted trencher series available in either 9 or 12 hp. models was released by the Witch Marketing Co.

The new trenchers are said to be suited to applications where traction or flotation is marginal, or where a considerable amount of maneuverability is required. Completely self-propelled and equipped with a steering device, it is reported to work well in digging in frost or rocky soil conditions due to the additional weight.



Crawler Mounted Trencher

A crawler adapter kit is also being manufactured which can be mounted to any M-3 series machine produced in 1959 or 60. It is said to be attached with five bolts to the frame of the machine, after the removal of the axles and axle bearings.

Witch Marketing Co., 1959 W. Fir Ave., Perry, Okla.

For more details circle 133 on Enclosed Return Postal Card.

Adjustable Steel Pilaster Form

A new steel pilaster form is being offered to concrete contractors by Symons-Clamp & Mfg. Co.

Each form has a 3 in. face toward the parent wall requiring an opposing filler or panel six in. wider than the width of the pilaster, and it will increase the versatility of the prefab form. The steel construction allows the form to be re-used. The forms are available in standard sizes from 3 to 8 ft.

Typical Form Layout

Symons Clamp & Mfg. Co., 4249 W. Diversey, Chicago 39, Ill.

For more details circle 134 on Enclosed Return Postal Card.

New Products

Push Type Welding Gun

A new air cooled push type welding gun and wire feeder for use with the gas-shield metal-arc welding process is now available from Air Reduction Sales Co.

The new gun, model AH6o-B, has 6o deg. goose-neck nozzle assembly for welding in hard-to-reach places, and a lever type trigger for ease of operation.

Push Type Welding Gun

It can be used with Buried arc welding and Sprayarc welding using carbon dioxide as a shielding gas, or standard gas-shield metal-arc welding, Aircomatic, using argon as a shield gas.

The wire feeder, designed for use with this new welding gun, includes a remote speed control with 15 ft. of service cord to provide wire feed speed adjustment, up to 600 in. per minute. The device operates on 115 volts, 60 cycle AC.

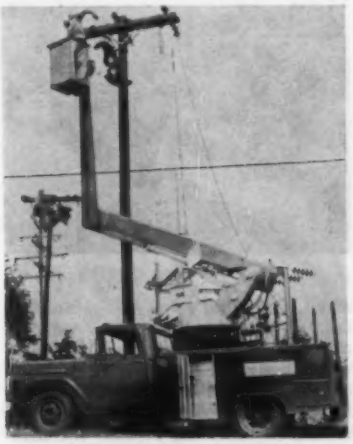
Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y.

For more details circle 135 on Enclosed Return Postal Card.

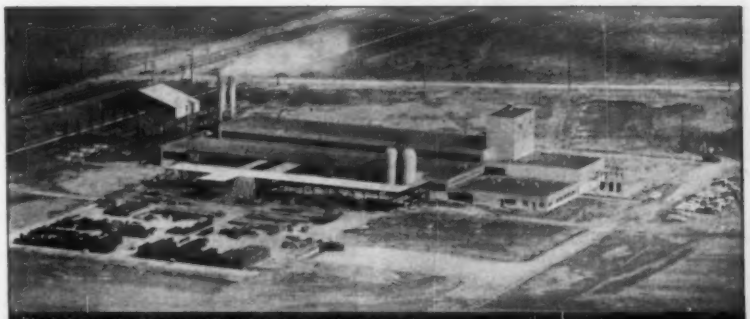
Aerial Lifts

A new line of aerial lifts that require no outriggers and may be mounted on vehicles as small as 1 ton trucks, has been announced by the Hunt-Pierce Corp.

Two standard Servi-Lift models are available, one with 36 ft. working



Aerial Lift—No Outriggers



Neenah Foundry Company Plant No. 2, in production now

Neenah Announces.....

. . . . the full-time operation of plant No. 2. The production from this 150,000 square feet facility increases our daily maximum capacity to 500 tons of Gray Iron and Ductile Iron CASTINGS.

Informative and fully illustrated 168-page catalog will be sent promptly upon request.

NEENAH FOUNDRY COMPANY

NEENAH • WISCONSIN

Chicago Office: 5445 North Neva Avenue, Chicago 31, Illinois

. . . for more details circle 330 on enclosed return postal card

LOOK TO FLINTKOTE FOR JET FUEL RESISTANT PAVEMENT SEALERS...

Send today for complete specifications and technical data sheets on the following:

• **FLINTSEAL JFR*** (Hot poured) A one-component, rubber-tar thermoplastic compound to be melted and poured. Cools quickly, retains tough, elastic bond in pavement joints and cracks through cycles of expansion and contraction. Fed. Spec. SS-S-167b.

• **FLINTKOTE M-200** (Cold-Applied) Two-component, polymer type sealer. Sets quickly, resists aircraft fuel, heat and blast from jets. Bonds perfectly to concrete and remains ductile at minus 20°F. Interim Fed. Spec. SS-S-00200a and pertinent Purchase Descriptions, as modified.

• Also ask about exciting new Flintcrete†—Flintkote's polysulfide/epoxy concrete bonding compound for pavement restoration and repair.
• And Flintar*/coal tar pitch emulsion. Fed. Spec. R-P-00355a for sealcoating bituminous pavements. Write: The Flintkote Company, P. O. Box 157, Whippany, New Jersey.

*Reg. U.S. Pat. Off. †T.M. of The Flintkote Company

FLINTKOTE

Manufacturer of diversified products for home and industry

. . for more details circle 294 on enclosed return postal card

New Products

height. Both models are mounted on an "H" frame which leaves deck and compartment space clear and permits mounting with minimum modifications on any standard or existing body. The torsion-bar stabilizer provides complete stability for lift operation, even with the truck in motion. Continuous 360 deg. horizontal rotation of the entire unit with no stopping point and 270 deg. rotation of the upper boom are standard. A lock valve at each orifice of the hydraulic cylinders prevent booms dropping in case of power failure.

Hunt-Pierce Corp., 59 Meadow St., Milford, Conn.

For more details circle 136 on Enclosed Return Postal Card.

Manual Welding Gun

A new manual welding gun and controls have recently been developed by Air Reduction Sales Co.

Designed for use in light to heavy fabrication where numerous short welds, and off the ground welds are necessary, the Aircomatic M1Get gun, as it is known, carries its own compact reel for wire, drive rolls and wire speed control in the gun itself. The operator can weld as far as 50 ft. from the con-

Manual Welding Gun

trol panel. In turn, the control panel can be placed as far as 150 ft. from the power source. The gun weighs 2½ lb., the control, less than 20 lb. Rated at 200 amp. DC reverse polarity at 100 percent duty cycle using argon or helium or 300 amp. DC reverse polarity using carbon dioxide, the gun will handle .030 to 0.45.

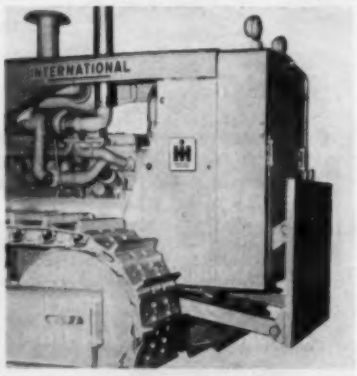
Air Reduction Sales Co., 150 E. 42nd St., New York 17, N. Y.

For more details circle 137 on Enclosed Return Postal Card.

Push Plate

A new, direct-mounted push plate, the Model 25-PF, which distributes loads to four separate areas of the tractor main frame now is available for the International TD 25 crawler.

The two in. thick plate, measuring 48 x 42 in., is mounted to the tractor frame by a rugged bracket-pin-strut arrangement. The top of the plate is supported by two, 2 in. thick brackets, with the plate secured to the brackets by two 2¼ in. hardened steel pins. Two, 2 in. thick struts extend forward



Direct-Mounted Push Plate

from the under side of the tractor engine frame to support the lower portion of the push plate. The plate is fastened to the struts by two 2¼ in. pins at these points also. The lipless design is said to make positioning simple and save pusher and scraper cycle time.

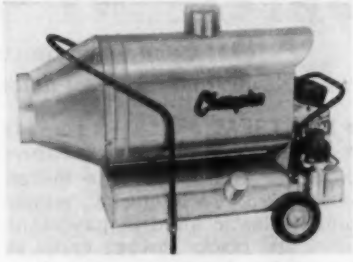
International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

For more details circle 138 on Enclosed Return Postal Card.

Portable Space Heater

An indirectly fired and vented portable space heater has been introduced by Champion Mfg. Co.

The new heater, Model 120, features completely fume-free odor-free operation, reports the manufacturer. Designed for use in confined areas where



Champion Portable Space Heater

fumes are objectionable, the heater circulates 1,885 cu. ft. of heated air per minute. It has a 15 hr. continuous burning capacity, fuel filter, high heat cut off switch and automatic purging. Thermostats are available as optional equipment. The unit will burn kerosene or number one fuel oil and operate on standard 110 volt AC.

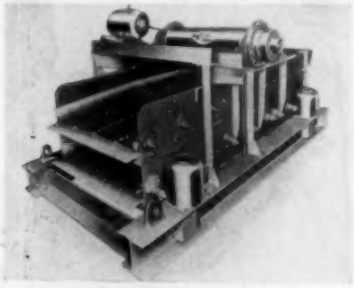
Champion Mfg. Co., 3700 Forest Pk. Ave., St. Louis 8, Mo.

For more details circle 139 on Enclosed Return Postal Card.

Improved Vibrating Screen

An improved enclosed spring and rubber mount suspension system for the Deister vibrating screen was announced by the Deister Machine Co.

Incorporating a welded H-beam base, the device is said to possess more dead weight, as opposed to vibrating weight. Only four mounts are used, one at each corner of the base. The springs used in the mounts are heavier than those previously used and work in conjunction with the rubber isolators to aid in the elimination of vibration to the supporting structure.



Deister Vibrating Screen

Springs are located to the outside of the side plates and are reported to be easily reached for adjustment or repair. Four lugs for cable suspension mounting are standard equipment.

Deister Machine Co., 1933 E. Wayne St., Ft. Wayne 4, Ind.

For more details circle 140 on Enclosed Return Postal Card.

Telescoping Platform Trailer

A new telescoping platform trailer which is reputed to provide double-duty performance for operators transporting both general purpose and extra long materials has been introduced by Fruehauf Trailer Co.

This new dual purpose platform adjusts in increments from a closed position of 35 ft. to a fully extended 55 ft. overall. Fruehauf says this range gives the operator a properly rated capacity for handling special length items such as steel and pre-stressed concrete

Dual Purpose Trailer

beams, structural steel girders and the like. Working as a general purpose unit from a closed position, the platform has a rated capacity of 50,000 lbs. for concentrated loads. In providing the telescoping platform with all the features of other big models, the manufacturer has included front and rear

New Products

corner castings, strong framings, I-beam steel crossmembers and two-speed square leg supports.

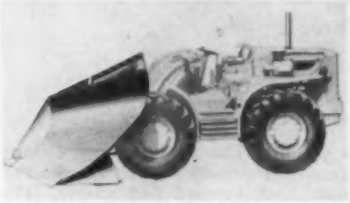
Fruehauf Trailer Co., Detroit 32, Mich.

For more details circle 141 on Enclosed Return Postal Card.

V-Type Snow Plows

Two new V-type snow plows have been added to the snow removal line of Omaha Steel Works.

Designed for Caterpillar 944 and 966 Traxcavators, the new units will be sold through Caterpillar dealers. The manufacturer announced that the new plows feature ease of installation and mold-board contour. The regular line of equipment manufactured by the



V-Type Snow Plow

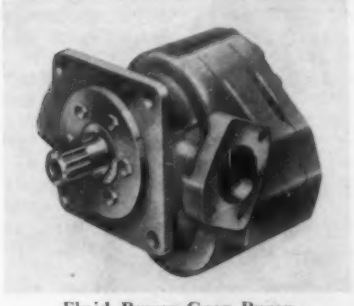
company for snow removal is hydraulic and mechanical bulldozers, V-type plows and mast type wings for various Cat equipment.

Omaha Steel Works, 609 S. 48th St., Omaha, Neb.

For more details circle 142 on Enclosed Return Postal Card.

Fluid Power Gear Pump

Incorporating a new system of pressure balancing internal parts in its basic gear pump, the Hydreco Div. of New York Brake Co. has developed a new series of fluid power gear pumps which are said to assure high volumetric efficiency and reduce frictional losses.



Fluid Power Gear Pump

Designated the Hydreco 3600A Series, the new gear pumps are available in three capacity ratings: 72; 92; and 112 gpm at 1200 rpm, O psi. They are said to operate on most applications at speeds up to 2000 rpm and at system pressures to 1500 psi. The manufacturer suggests the pumps are particularly suited for applications on high capacity earth moving equipment and materials handling machinery.

Hydreco Div. of New York Air Brake Co., 9000 E. Michigan Ave., Kalamazoo, Mich.

For more details circle 143 on Enclosed Return Postal Card.

Liquid Level Indicator

A liquid level indicator that does not depend upon capacitance or capacitors has been developed by the Electronic Dept. of Hamilton Standard.

To be used to measure lubricants and other liquids on engines and processing equipment, the main components of the device, an electronic control and a sensing element and combined as a single unit, can be engine-mounted and installed where heat and vibration prevent use of conventional

Liquid Level Indicator

indicators. Response time is adjustable, and a special design feature prevents false reading. In normal operation, the indicator remains off until the liquid level drops to a predetermined point when it flashes or sounds a warning. The circuit can be checked at any time with a press-to-test button.

Electronics Dept., D-40, Hamilton Standard, Broad Brook, Conn.

For more details circle 144 on Enclosed Return Postal Card.

30 Ton Carrier

Production of a new universal 25 to 30 ton carrier has been announced by Crane Carrier Corp.

To be known as the Universal 2564 Carrier Series, the new CCC carrier will be produced in a single model for 25 to 30 ton capacity upper. The new unit is reported to accommodate most of the ratings and gross vehicle weight capacity requirements of uppers manufactured into one basic vehicle. The company announced that the unit will not replace the custom-designed crane carriers now produced by that organization.

Crane Carrier Corp., 1150 N. Peoria Ave., Tulsa, Oklahoma

For more details circle 145 on Enclosed Return Postal Card.

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SIGNS

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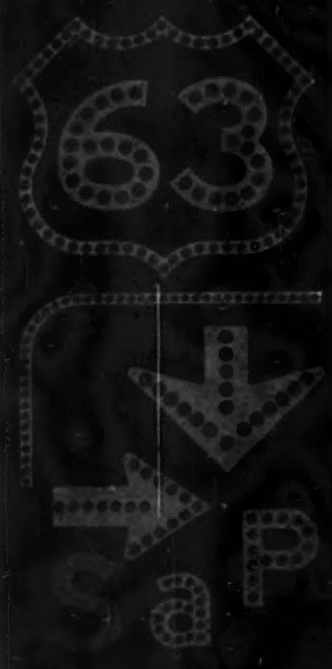
INDIVIDUAL CUTOUT

- LETTERS
- ARROWS
- NUMERALS
- BORDERS
- CORNERS
- SHAPES



Make your own signs—with Miro-Flex pre-cut aluminum letters, figures, borders, and numerals. Available in wide variety of finishes with or without reflector buttons, reflective sheeting, beaded, plain enameled, or unfinished. Design recommended by AASHO and approved by U. S. Department of Commerce, Bureau of Public Roads. Send for free catalog!

WRITE PHONE WIRE...

THE MIRO-FLEX CO., INC.

1824 EAST SECOND STREET
WICHITA 14, KANSAS

. . . for more details circle 325 on enclosed return postal card

Wire Pulley

A new rubber-lagged wing pulley has recently been introduced to industry by the Van Gorp Mfg., Inc.

The exterior edge of the wing consists of a U shaped steel channel which receives a steel encased rubber bar. Because

Wing Pulley

of the grip the rubber bars provide, dried material on the underside of conveyor belts is spalled off, helping to eliminate the need for pulley cleaning shutdowns.

Van Gorp Mfg., Inc., Pella, Iowa

For more details circle 146 on Enclosed Return Postal Card.

Reflectors

A new reflector with a hole in the middle permitting use of a single fastener for mounting is now being manufactured by the Stimsonite Div. of Elastic Stop Nut Corp.

Called the Cent-R-Mount, it can be mounted with a screw, drive nail, rivet or nut and bolt. The reflector carries the new ICC engraving, conforming to new regulations of the ICC. Available as a patented foil seal unit, the acrylic flange is bonded to aluminum foil for hermetic seal. It is also available foil sealed and in a polyethelene housing. The device is available in either red or amber, and is said to produce seven sq. in. of effective reflex area.

Stimsonite Div. of Elastic Stop Nut Corp., 3445 N. Kimble Ave., Chicago 18, Ill.

For more details circle 147 on Enclosed Return Postal Card.

Self-Propelled Tamping Roller

A self-propelled tamping roller, the Ferguson SP-120, was announced recently by the Shovel Supply Co. of Dallas.

The unit is equipped with two 5 ft. x 5 ft. drums, wedge-type feet and powered with a General Motors 4-71 125 hp. diesel engine and Allison torque converter. Empty, the roller exerts a bearing pressure of 372 psi.; ballasted with

Ferguson Self-Propelled Tamper

water, the pressure is 550 psi. The Allison 3 speed transmission and torque converter provides speed of approximately 2, 4, and 8 mph. both forward and reverse. The unit is equipped with air brakes. The unit is said to save working time due to its ability to operate equally well in either direction.

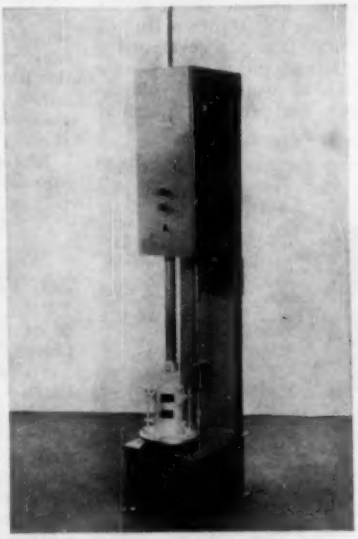
Shovel Supply Co., Inc., 4900 Hines Blvd., Dallas, Texas.

For more details circle 148 on Enclosed Return Postal Card.

Mechanical Compaction Apparatus

A new mechanical compaction apparatus for laboratory use has been developed by Soiltest, Inc.

The apparatus was designed to enable soil testing laboratories, engineers, contractors and highway departments to rapidly and uniformly perform the standard and modi-



Soiltest Compaction Apparatus

fied soil compaction tests, the company reports. The device will accommodate both the standard 4 in. and modified 6 in. dia. testing molds.

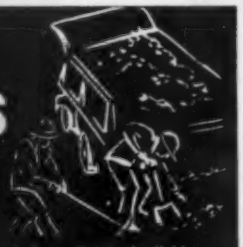
Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.

For more details circle 149 on Enclosed Return Postal Card.

POT HOLES
PUTTING HOLES
in your BUDGET?

SAVE TIME, MONEY and LABOR with

KOTAL
All Weather
Processed Bituminous
STOCKPILE MIX



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For information regarding your nearest producer or franchise areas available — write to

KOTAL Company

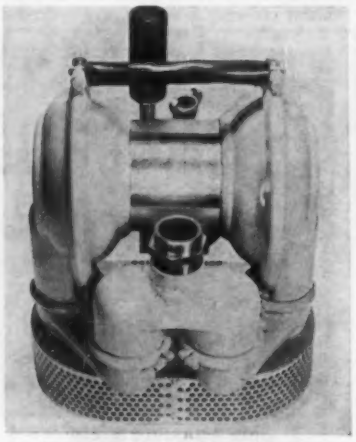
119 Summit Avenue • Summit, N. J.

. . . for more details circle 317 on enclosed return postal card

Pneumatic Diaphragm Pump

A new model, the DA-4, was recently announced added to the Layton line of pneumatic diaphragm pumps.

The new 2 in. pump, designed for use in construction and mining, is a one man, protable, compact and quiet unit that will self-prime and ejects fluids with percentage of solids and highly abrasive liquids. Standing 21 in. high, it has a maximum length and width of 16¼ in. and weighs 79 lb. The new pump will deliver 6300 gph.



Pneumatic Diaphragm Pump

at a 10 ft. discharge head and pumps against heads of 100 ft. or more. The diaphragms are fastened peripherally at each end and joined securely by a connecting rod, allowing free, simultaneous flexing in and out.

Layton Co., Inc., 4749 S. Whitnall Ave., Cudahy, Wis.

For more details circle 150 on Enclosed Return Postal Card.

Concrete Vibrator

Changes and improvements in the 25,000 vpm. "Solo" concrete vibrator was announced by Pacific Mercury.

New design and engineering has reduced the entire motor-in-head unit of the device to just four moving parts. Vibrators now operate from standard 120 volt, 60 cycle current or from 120 volt direct current. The one man operated unit utilizes a new high frequency vibration principle that is said to eliminate eccentric bearing loads and the bearings themselves.

The principle employed is simple: A new type high speed motor with a fully counterbalanced arm or tang mounted on the armature shaft is used. The arm drives a large steel ball around a track within the head so that the moving ball produces high frequency vibrations even though the loading on the shaft is torsional.

Pacific Mercury, 685 S. Carondelet, Los Angeles 57, Calif.

For more details circle 151 on Enclosed Return Postal Card.

Hydraulic Hoe Attachment

A new 2 in 1 hydraulic hoe attachment, designed for hoe or front end loader application with B-E 22 B crawler machines has been announced by Bucyrus-Erie Co.

The machine is said to be useful for production type trenching in cramped, congested quarters or in areas normally restricted to smaller, less capacity excavators. Some of the features include a 15 ft. boom, a hydraulic "hoe-down" device which acts as a hydraulic brake to hold down the boom and, push-button hydraulic-powered wrist action for 1½ yd., 12 in. wide dipper. The trench-wide dipper has two cut-

Hydraulic Hoe Attachment

ting edges with teeth for operation as a hoe or shovel-front end loader.

Bucyrus-Erie Co., South Milwaukee, Wis.

For more details circle 152 on Enclosed Return Postal Card.

NOW! Get Circulation Where It Counts . . .

Roads and Streets' Clearing House REACHES THE MARKET'S HEART

INDIVIDUAL CONTRACTORS
CITY, COUNTY ENGINEERS
CITY, COUNTY OFFICIALS

Long a leader serving the heavy construction and associated fields, ROADS AND STREETS' "cream" circulation goes to the important men in the business. They are the men, who directly or indirectly influence the purchase and sales of new and used equipment and supplies.

When you are "in the market" reach the logical buyer or seller quickly—at a reasonable cost to yourself.

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Just clip the coupon below and attach your copy.

CLIP YOUR AD COPY TO THIS HANDY ORDER FORM AND MAIL TO

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60 in.	9.80
90 in.	9.65
120 in.	9.50
180 in.	9.25
360 in.	9.00

COPY AND CLOSING DATES

Final closing date is the Fifteenth of the preceding month. Magazine is issued 1st of publication month. If proof is desired, copy must be received 5 days preceding closing date.

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ROADS AND STREETS
22 W. MAPLE STREET, CHICAGO 10, ILL.

Please Insert the Attached Advertising Copy in the Next Issue of ROADS AND STREETS to Occupy_____Inches of Space.

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NAME_____

COMPANY_____

ADDRESS_____

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TELL US WHAT YOU HAVE TO OFFER AND WE'LL SET UP THE AD FOR YOU.

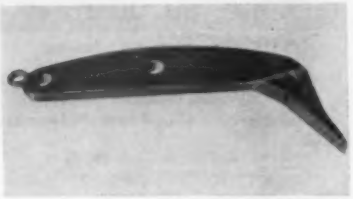
Ripper Point

A new ripper point that is designed to increase ripping yardage has been introduced by the Construction Div., Esco.

Made of new Esco alloy 12S, the unit features a greater radial length and narrowness, and sharpness of design, states the manufacturer. The company is also marketing cast ripper shanks in Asco Alloy 12 M and welded-nose sections that will convert most shanks to Esco ripper points.

Esco, 2141 N. W. 25th Ave., Portland 10, Ore.

For more details circle 153 on Enclosed Return Postal Card.



Gas Pressure Regulators

A new line of two-stage gas pressure regulators without the conventional glass covered gauges has recently been marketed by Air Reduction.

Available for both oxygen and acetylene cylinder use in welding, heating or cutting operation, the new gaugeless regulators are useful where extremely rough usage is encountered, and where continuous quality performance is necessary.

Delivery pressure is set with a micrometer type indicator. Two ranges of regulation are available by means of a low-high marking on the adjusting knob, and three lines on the spring case. Conversion kits for changing conventionally gauged regulators in the same class gaugeless regulators are also available.

Airco Co., International., Div. of Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y.

For more details circle 154 on Enclosed Return Postal Card.

Vibrating Screed

A new vibrating screed has recently become available in lengths of from 8 to 50 ft., announced Stow Mfg. Co.

Driven by a 2½ hp. gas power pak that is mounted on the beam, the manufacturer reports that any desired amplitude can be obtained. The wooden screed beam has 5 in. side steel flanges on either side of the beam which form the screeding surface. The flanges can be raised up or down at points along the length by use of bolts to correct for beam deflection and provide a crown. Rollers are attached to the beam so that by just loosening a few bolts an adjustment for length up to 6 ft. can be made. 9:1 ratio hand winches are available and recommended for steady pull on screeds longer than 12 ft.

Stow Vibrating Screed

Stow Mfg. Co., 65 Shear St., Binghamton, N. Y.

For more details circle 155 on Enclosed Return Postal Card.

Engine Safety Control System

A new, non-electric, self-powered safety control system that protects all types of engine installations against dangerous overspeed temperature and pressure conditions has been announced by California Controls Co.

Operated through a small captive charge of compressed air, the system requires no batteries or other special electrical supplies. The Calcon control can put into operation almost any type of pilot operated valve, switch, warning or other device when the captive air charge is dumped to atmosphere by sensing units. All parts of the system are connected with standard copper tubing, and all repair jobs are reported to be easily made in the field by replacing standard components.

California Controls Co., 1525 Powell St., Oakland 8, Calif.

For more details circle 156 on Enclosed Return Postal Card.

Continued on page 170

ROTARY SWEEPER BROOMS

WE MANUFACTURE

- Austin - Western
- Cub Low Boy
- Del-Harvester
- Fordson
- Ferguson
- Grace
- Gutteronipo
- Hough
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- Jeep-Willy's
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- Ram
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- Wayne Model 480
- And Many Others

Special Cores made to order

• COCOA ROLLER MATS •

Drag Broom Levelers
Street Push-Concrete Brooms

RE FILLING BUILDING PAIRS

KENNEDY'S

VAN BRUSH MFG. CO. INC

2728 McGee Trfwy. Kansas City, Mo.

INGRAM ROLLERS

FOR RENT NEW INGRAM ROLLERS
5 to 12 TONS
TANDEM AND 3-WHEEL

Acme IRON WORKS
CULEBRA AVE. AT EXPRESSWAY N.W.
P.O. BOX 2026 • SAN ANTONIO 6, TEXAS

HELP WANTED

"Plant superintendent for large eastern crushed stone and bituminous concrete manufacturing company which operates plants in New York, Pennsylvania, and Virginia. Engineering background required. Age from 30 to 40 years. Salary commensurate with experience. Excellent employee benefits provided by Company. Please send complete resume."

Write Box 1233, Roads & Streets, 22 W. Maple St., Chicago 10, Ill.

FOR SALE

CRANES

INSLEY Model K-12 - 40' Boom - Power Chrysler Industrial engine. Shovel and back hoe fronts available. Rebuilt.

INSLEY Model K-10 - 40' Boom - Power Buda gas engine. Shovel and back hoe fronts available. Good condition.

COMPRESSORS -

Reciprocating Type

LE ROI 105 CFM - Power 4 cyl. LeRoi engine - mounted on two (2) pneumatic tires. Good condition.

JAEGER 125 CFM - Power Continental Gas Engine - mounted on two (2) pneumatic tires. Rebuilt.

Davey 125 DFM - Power Hercules Gas Engine - mounted on two (2) pneumatic tires. Rebuilt.

SCHRAMM 315 CFM - Power International Diesel Engine - mounted on 1958 C-600 Ford Truck. Excellent Condition.

EARTH MOVERS -

Self-Propelled

LE TOURNEAU - Two (2) Model "CR" Tournapulls - power 6 cylinder Cummins Diesel Engines. 21:00 x 25 Tires. Very good condition.

HYDROCRANE

BUCYRUS-ERIE Model H3 - Power Ford Industrial Engine - mounted on 1958 A170 International Truck. Excellent condition.

LOADERS - RUBBER TIRED

HOUGH Model HE - Power Waukesha Gas Engine. Excellent condition.

HOUGH Model HF - Power Hercules Gas Engine - equipped with Wain-Roy backhoe. Excellent condition.

PUMPS

JAEGER Model 4P - 4" Centrifugal - power 4 cylinder Continental Gas Engine. Mounted on two (2) steel wheels. Completely rebuilt.

STONE SPREADER

JAEGER - Model SPS-1C - mounted on crawlers - power 6 cylinder Continental gas. Completely rebuilt.

CALL - WIRE - WRITE:

W. F. Rippel

THE WESTPORT MACHINERY COMPANY

1801 Cherry Hill Road - MUlberry 5-0402
Baltimore 30, Maryland

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BELOW SURPLUS PRICES!

Urgent Inventory Reduction Sale!
QUALITY GUARANTEED

All Items Are Improved Plow Steel, Preformed, Regular Lay And Black, Unless Otherwise Indicated.

SIZE	DESCRIPTION	PRICE FT.
3/8" - 6 x 37	H.C.	$ .11
1/2" - 6 x 19	H.C. Galvanized	.12
1/2" - 6 x 37	H.C.	.13
1/2" - 6 x 37	H.C. Galvanized	.16
9/16" - 6 x 19	I.W.R.C.	.15
9/16" - 6 x 19	I.W.R.C. Lang Lay	.15
9/16" - 6 x 19	H.C. Galvanized	.14
9/16" - 6 x 37	I.W.R.C. Lang Lay	.15
5/8" - 6 x 37	H.C.	.16
5/8" - 6 x 37	H.C. Galvanized	.20
3/4" - 6 x 19	I.W.R.C. Lang Lay	.22
3/4" - 6 x 37	H.C.	.23
3/4" - 6 x 37	H.C. Galvanized	.29
7/8" - 6 x 19	I.W.R.C. Lang Lay	.28
7/8" - 6 x 19	H.C. Galvanized	.29
7/8" - 6 x 37	H.C.	.29
1" - 6 x 19	I.W.R.C.	.35
1" - 6 x 19	I.W.R.C. Lang Lay	.35
1" - 6 x 37	H.C.	.36
1" - 6 x 37	I.W.R.C.	.44
1" - 6 x 37	H.C. Galvanized	.45
1 1/8" - 6 x 19	H.C.	.36
1 1/8" - 6 x 19	I.W.R.C.	.43
1 1/8" - 6 x 19	I.W.R.C. Lang Lay	.43
1 1/8" - 6 x 19	H.C. Galvanized	.45
1 1/8" - 6 x 37	H.C.	.45
1 1/4" - 6 x 19	I.W.R.C.	.52
1 1/4" - 6 x 19	H.C. Galvanized	.54
1 1/4" - 6 x 37	H.C. Galvanized	.68

No Order Accepted Under 1000 Ft. Per Item - F.O.B. West Coast - TERMS To Approved Credit Accounts. Collect Calls Accepted With Sizeable Order.

Subject To Prior Sale

Northwest Wire Rope Co.

966-77th Ave. - Phone LO 2-2953
OAKLAND 21, CALIFORNIA

FOR SALE OR RENT

(3) Ingersoll-Rand Model DR-600 Rotary **AIR COMPRESSORS** on 4 pneu.
S/N AR-20101, used 414 hrs.
Sale price .....$15,900.
S/N AR18130, used 717 hrs.
.....$14,300.
S/N AR-16036, used 1800 hrs.
.....$12,300.
(1) Ingersoll-Rand Mod. DR-315 Rotary **AIR COMPRESSOR** on 4 pneu. S/N DR-10285, used 2 yrs. Exc. condition ..$7,500.
(2) Ingersoll-Rand IKA-210 **RECIPROCATORS.** As is, Where is .....$1,000 ea.
(1) Ingersoll-Rand Mod. GR-85 Rotary **AIR COMPRESSOR** on 2 pneu. S/N MR-17030. Used less than 1 yr. Exc. condition.$2,250.
(1) Ingersoll-Rand **CRAWL-IR** Mod. CM2-D45 DRILL. S/N 17304. Used 3 months. Exc. Con. Guaranteed .....$12,000.
(2) Ingersoll-Rand Mod. **FM2 WAGON DRILLS** w/X-71 Drifters. S/N's 721169 & 731236 .....$2,200. ea.
(1) LeRoi Mod. 315 **RECIPROCATOR COMPRESSOR.** As is, where is .....$1,500.
(1) LeRoi Mod. 250 **DIESEL COMPRESSOR,** Exc. cond. .....$3,000.
(1) **SCHRAMM** Mod. 210 w/Int. Diesel Eng. Good cond. S/N 316385. .....$2,500.
(1) **JAEGER** Mod. 60 S/N C2345. Good cond. .....$900.
(1) Nelson Mod. 200, 2¼ yd. **TRACTOR SHOVEL,** S/N 2E231. (Used as Demonstrator only.) Continental gas eng. Factory list .....$18,200.
Sale price .....$15,000.
(1) **PETTIBONE-MULLIKEN** Mod. 125A S/N 765. (Used as Demonstrator Only.) Factory List $15,300. Sale Price ..$13,500.
(1) **Used Shield-Bantam** w/Pull-shovel attach. Mod. T-35 monted on Crane Carrier. '58 Mod. Exc. condition .....$12,000.
(1) Northwest Mod. 25 **PULL-SHOVEL** mounted on 28" treads: 11'-11" Crawlers w/Murphy Diesel eng. S/N 18265. Exc. con.
.....**$19,000.**
(1) Mod. 85AC quickway **BACK-HOE** w/Continental gas eng. mounted on 24" crawler pads, '60 mod., slightly used. Orig. cost $14,500. Sale Price .....$9,000.
(1) Mod. 105A quickway ½ yd. TRUCK mounted on crane carrier w/backhoe attach., '58, used. Original cost, $19,500. Sale price .....$11,000.
For further information on any of the above equipment.

Phone or Wire Collect

Central New York Eqpt. Co., Inc.
2136 Erie Blvd. E., Syracuse, N.Y.
Phone: GRanite 2-9169

(1) Compactor

Seamon Andwall model 5620, 17 wheel, 7 to 20 ton capacity. Tires 7.50 by 15.

(1) Trailer

Fruehauf 50 ton Level Deck, Tires 7.50 by 18, 14 ply.

Above Equipment in Good Operating Condition and Priced Right

DEEDS EQUIPMENT CO.

8015 E. 45th St., Lawrence, Ind.
LI 5-3331

SAVES 60%

OF THE COST OF MEASURING DISTANCES

MAINCO DISTANCE MEASURING WHEEL

ONE MAN and a MAINCO WHEEL does it better, faster than 2 men using chain or tape

Send for descriptive folder

THE MAINTENANCE CO., INC. Dept. D
10-40 45th Ave., Long Island City 1, N. Y.

PRICE IS RIGHT

Cedar Rapids Portable Primary 20" x 36" R.B., 30" belt, feeder truck loading hopper, D-8800 Power Unit, tandem rubber, air brakes.

Lippman Portable Plant, 20 x 30 Jaws R.B., 30 x 18 rolls, R.B. rotavator 3' x 8' double deck screen and feeder, tandem rubber, air brakes.

Cedar Rapids, skid mounted, 12 x 36 twin jaw R.B., powered by UD-18 diesel.

Late Model TD-18A International Tractor, 3 yard Drott bucket loader.

All the Above Equipment in Excellent Shape and Reconditioned. Check Them Over, Look, At Our Maintenance Records.

WILTGEN STEEL BUILDING SALES

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LE MARS, IOWA

Here's A Real Steal

20—1956 T-700 Fords with:

BD-320 Engine

5 Speed Transmission, some with auxiliaries

Some with Power Steering

22,000 Lb. Bogies

Frame Reinforcement

Some with 8.25x20 Tires, 10 Ply

Some with 9.00x22.5 Tires, 10 Ply

If you are looking for cheapies, you can buy these at a steal. Priced from $1550 to $1750.

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JOHNSON READY MIX PLANT

Bin 120 yd., 3 agg. 1 cement, Cement Elevator, Undertrack Screw, Agg. Elevator & Truck Hopper. 600 Bbl. Cement Bin.
Available now—trade on new Rex Plant.

EIGHMY EQUIPMENT COMPANY

Pierpont at W. State St. WO 4-6706
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FOR SALE

1—Link-Belt LS-85 Crane or Dragline, Cat. D-318 Diesel Engine, 50' boom, 7 years old—very good condition.
1—White Model L-8 Asphalt Plant with gasoline engine—good condition.
1—Barber-Green Mix-All with gasoline engine, on two pneumatic tires—good condition.
1—Garwood Model 524, 15-18 yd. tractor drawn Scraper, good tires—good condition.
1—Curtiss-Wright Model 150-B 20-26 yd. tractor-drawn Scraper, air brakes, practically new.
1—Littleford Model 115 Tankar Heater—good condition.

Discount to Dealers

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DRAGLINE-BACKHOE

Wayne Model #66
Gas engine, long and wide Crawler, rebuilt.

DRAGLINE

Bay City Model #45
Gas engine, long and wide Crawler, rebuilt.

BACKHOE

Osgood Model #200
Diesel engine, long & wide Crawler, rebuilt.

GENERAL MODEL 420

Dragline, Diesel Engine
Long & Wide Crawlers (Rebuilt)

DRAGLINE

General Model #307
Diesel engine, long & wide Crawler, fair condition.

Additional Information & Pictures Available upon Request

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WAterfall 8-5512—Chicago
EDison 3-0222—Harvey

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PIONEER 412VW Portable Washing Plant, 150 tph capacity, with twin screw washer, 4x12 screen, power, feeder, conveyors, piping, tandem rubber. Good. $14,000 Rental Purchase.

CEDARAPIDS 2036 Jaw Portable Primary with feeder, conveyor, Cat. diesel, tandem rubber, rebuilt completely. $18,000.

EUCLID Twin Power Motorscraper. 18-24 cy., two 190 hp. GM diesels, torque convectors, just factory rebuilt. $1850 mo. $18,000.

MICHIGAN 175AD Loaders, good reasonable.

KOEHRING 25-ton Motorcrane, 304, used 1980 hrs., late model, like new. $1250 mo. $20,000.

QUICKWAY 125A Backhoe, new 1956, 6/10 cy., on 4-ton 6x6 carrier. Excellent. $400 mo. $6000.

QUICKWAY L Backhoe on 4-ton 6x6 carrier, 4/10 cy., very good. $300 mo. $2500.

BANTAM T35 Backhoe on Bantam 200 Motorcrane Carrier, gooseneck boom, good. $450 mo. $6750.

TAMPO SP9 Pneumatic tired Roller, Self Propelled, excellent. $350 mo. $3250.

GALION 5-8-ton Tandem roller, new 1954, excellent. $350 mo. $3500.

BUFFALO SPRINGFIELD 8-12-ton Tandem Roller, KT19A8, new 1957. $475 mo. $5500.

CLEAVER BROOKS 3-Car Heater, portable, excellent. $1350.

DEARBORN AUGUR on Ford Tractor, good. $600.

WRECKING BALLS, 6000 lbs. new, pear shaped. $350.

(2) **AMERICAN** 2-Drum Hoists with 40 hp. gasoline engines, excellent. $750 each.

ARPS TRENCH HOG, like new, on late model. For tractor. $300 mo. $2350.

CRANE 20-ton Lo-Boy Trailer, tandem, new. $350 mo. $3000.

WENZEL MACHINERY CO.
565 S. 10th, Kansas City, Kansas
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SPECIAL OFFERING

Essick VR-72 Vibratory Compactor

Latest Model—used less than 30 days

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KING & EAST MACHINERY CORPORATION
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USED STEEL

BEAMS—8" to 36" WF, H & I
CASING-PIPE 12" to 10' Dia.
B.P.'S—PLATE—ANGLES
WANTED: YOUR SURPLUS STEEL

LEOPOLD COHEN IRON CO.
3000 S. Kedzie, Chicago 23, Ill.

PAVING EQUIPMENT

You will find listed below the equipment contained in a complete paving spread. These machines are all in excellent condition and ready to go to work. We are disposing of this equipment due to the press of business in related fields of construction. All of this equipment meets state highway specifications.

1—60 cu. yd. 2-compartment sand bin, cantilever platform, columns 16'7", truck clearance 8'6". Wt. 15,910#.

1—34E. automatic type "J" dual stone and sand batcher with over-under weight lights. Wt. 4,580#.

1—37 yd. 11' dia. cement bin, cantilever, detachable columns 14'2", truck clearance 8'6". Wt. 9,174#.

1—Bin signal with adjustable support. Wt. 36#

2—34 E. automatic interlocked cement batchers with two 8x15 electric air operated filling valves, two 8x15 automatic vane feeders, two 2 H.P. single speed Gearhead Unibrake motors (110 Volt) electrical controls. Wt. 5,500#.

2—Electric vibrators 110 Volt. Wt. 34#.

1—#44 cement elevator by 37' c/c 10" undertrack screw by 29'9" c/c. 10 H.P. drive and guard, parting detail (last 10' of screw removable.) Wt. 11,496#.

2/3 Set quick air connections for 2 bins and electrical connections and wiring for two bins.

THE ABOVE LISTED EQUIPMENT COMBINES TO MAKE ONE COMPLETE BUTLER BATCH PLANT FOR PAVING OUTFIT.

1—Quincy Electric Air Compressor.
1—Schramm Electric Air Compressor.
1—Hex 34E Double Drum Paver with Diesel motor, ad-air attachment, automatic controls, S/N GD305.
1—Heltzel Finishing Machine S/N 56x128 18' to 25'.
1—Jackson Vibrator and Paving Tube S/N 83290 Model PT-202A.

1—Heltzel Mechanical Belting Machine S/N 56x137 18' to 26'.
1—Heltzel Bridge 18' to 26'
2—Cleveland Form Tampers S/N 306x56
S/N 320x56LB
1—Joint Applicator S/N 459 Model RJ-P.
1—Tar Kettle S/N 45-3366 Model AB-120.

6000' 10x10 paving forms.
1—Cement Car Vibrator.
2—Heltzel subgraders (tail blades) Adj. from 20 to 25 ft.
1—Cleveland subgrade scraper S/N 52x68.
1—Cleveland Form Grader S/N 236x56.
1—Tar kettle S/N 45-3366. Model AB-120.

ALL OF THE ABOVE EQUIPMENT WAS PURCHASED NEW IN 1956 AND HAS HAD VERY LITTLE USE. DURING 1958 IT POURED APPROXIMATELY 18,000 FEET OF FULL WIDTH SLAB AND WAS NOT USED DURING 1959.

1—Koehring Longitudinal Finisher, 20 to 24 foot widths with transportation wheels having four 6:00 x 16 Pneumatic tires and towing bar. Rubber wheels for one side.

1—Jaeger Concrete Spreader finisher. Model CSS20-25. S/N 57876, with Quick Crown Change Screed with one complete set of extensions, set for 24' width, 25/32" crown incl. 4 part #30088-2 single flanged and 2 part x3039-2 cone tread traction wheels installed with little lugs. Rubber wheels one side.

THE ABOVE EQUIPMENT HAS POURED APPROXIMATELY 18,000 FEET OF FULL WIDTH SLAB SINCE PURCHASED NEW IN 1958.

1—CMC 6 cu. yd. Transerete Mixer S/N 106832.
1—Blaw Knox 3 cu. yd. mixer S/N 48-H3-287.
1—Butler Batch Plant
Complete Stop Plant with one cement Elevator—Ideal for Ready Mix Plant—Fully automatic to meet highway specifications.

1—Track Plant for unloading bulk cement into trucks. Complete with cement screw.
1—Universal 10x24 & AW crusher. Roller Bearings S/N 119x50.
1—Adams 610 Motor Grader S/N 2523.
1—Caterpillar #12 Motor Grader S/N 8T2158.

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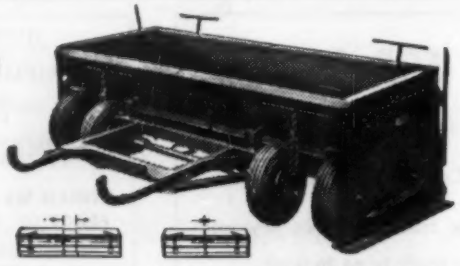

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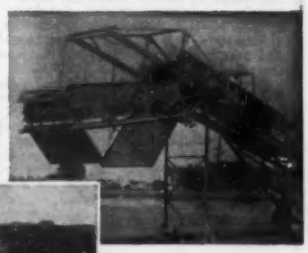

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(1) Mod. TC-12 Euclid twin engine crawler tractor with pushblade, rebuilt.

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3 Late LeTourneau Model B Scrapers, New Condition $19,500 each. Will consider trade in. Durabilt Const. Co., 7015 Bellevue Blvd. Omaha 47, Nebr.

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MODEL 25 NORTHWEST

DIESEL POWERED FULL SHOVELS
1—NORTHWEST ¾ YD. 371 GM.
1—NORTHWEST ¾ YD. CAT. 4600

ATTACHMENTS
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Shovel—Fairleads—Boom Sections
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Tubes—$5.00 Ea.
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Caterpillar 12 Grader 8T, Cab, large tires, Caterpillar Power Steering	$5,950.00
Cat 70 Scraper, Large Tires	5,750.00
LaPlante-Choate C106 Scraper	1,750.00
LeTourneau LS Scrapers 8-11 yds.	2,750.00
Buffalo-Springfield KT16C4 Roller	3,750.00
Parsons 88 Ditcher on Rubber	1,750.00
Barber-Greene 705B Ditcher	1,900.00
Cat D12000 Power Unit Complete	1,250.00
Cat D337 Power Unit Complete	1,600.00
Murphy ME650 Power Unit Complete	1,600.00
LaCrosse 25 Ton Low-Boy, 10.00x15's	2,500.00
American Oil Field Float, 28'	975.00
GMC 620 Tamden Dumps (2) each	2,650.00
Hyster D6N, Towing Winch,	
Lorain 41 New Shovel Front, Complete	1,250.00

AL. FISHEL & CO. - JEfferson 5-4482
1318 N. Vandeventer Ave. - St. Louis 13, Mo.

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714 Phillips Ave. Toledo 12, Ohio
GReenwood 4-5471

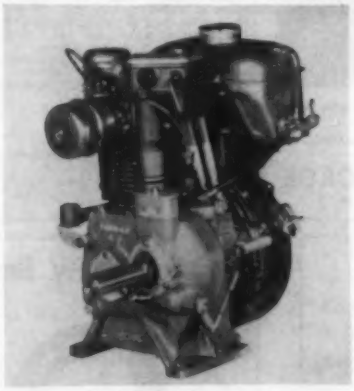
New Products

Continued from page 158

Light-Weight Diesel

A light weight line of self contained, air-cooled diesel engines in the 2 to 4½ bhp. range is now available for powering portable equipment as well as emergency pumps and generators.

Known as Yanmar, these 4 cycle, single cylinder engines



Light-Weight Diesel

operate in the 2000 to 3000 rpm range and may be obtained in two sizes with either crank shaft or half-speed cam shaft drives.

Similar small diesels are also available in water-cooled models to 8 bhp. at 2000 rpm. Imported from Japan, the engines have been manufactured to U. S. standards for the American market.

Continental Machinery Corp., P. O. Box 5309, Long Beach 5, California.

For more details circle 157 on Enclosed Return Postal Card.

Metal Protection

A black coating, for protecting metal against rust and other exposure conditions has been announced by Maintenance, Inc.

Offered under the trade name Everwear J-41 B, the paint is reputed to produce an attractive ebony black finish that will withstand water and chemical attack by gas fumes and smoke. It is said to be anti-corrosive above and below grade. It is reported to remain elastic, permitting it to expand and contract with metal during extreme temperature changes, making it useful in painting of tanks, metal roofs, bridges, beams and the like. The paint can be either brushed on or sprayed, and comes in 5 gal. pails or 55 gal. drums.

Maintenance Inc., Wooster, Ohio.

For more details circle 158 on Enclosed Return Postal Card.

Concrete Adhesive

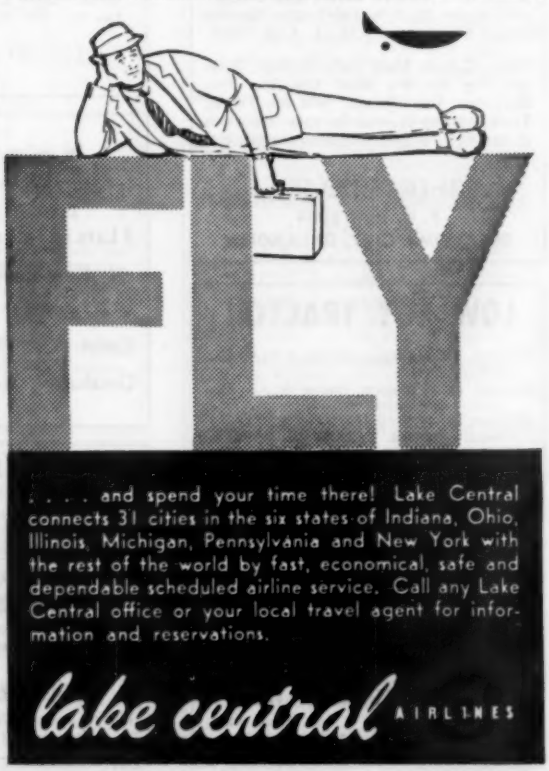
A new type of concrete adhesive for bonding new to old and old to old concrete has been introduced by Horn Research Laboratories.

A two-component, modified epoxy resin compound called Thiopoxy, the material is reported to be unaffected by moderately damp conditions, or impact after aging and in no way causes failure due to brittleness or loss of adhesion. Recommended for spalling or scalling concrete areas, broken slabs or cracks, it is said to secure overlays of Portland cement concrete surfaces, terrazzo, sidewalks and roadway resurfacing.

A. C. Horn Co., Div. of Sun Chemical Corp., 2133 85th St., North Bergen, N. J.

For more details circle 169 on Enclosed Return Postal Card.

For further information on any product listed in this section, circle the corresponding number on the "reader inquiry card", on page 143.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Manufacturers Literature

LOW COST CURES: A new pamphlet entitled "Low Cost Cures" available from Visking Co., 6733 W. 65th St., Chicago 38, Ill., describes the use of Visqueen film as a curing blanket on concrete slab work for highways, streeets, sidewalks, curbs and gutters. Recommended specifications are given, and the results of moisture retention and crush tests are shown. The film's application as a subgrade water vapor barrier is also explained in the 4 pg. folder.

For more details circle 160 on Enclosed Return Postal Card.

ASPHALT BATCH PLANTS: In a new 32 page brochure, Barber-Greene Co. describes in detail, their full line of automatic "BatchOmatic," semi-automatic and "Power Control" asphalt batch plants.

The folder lists a dozen or more engineering and design features, most of which are common to all types and sizes of their plants.

Barber-Greene's complete line of matched and auxiliary equipment for all plant sizes and types are also described and illustrated in the folder. Among these auxiliary components are dryers, dust collectors, wet collectors, automatic fines metering systems and a wide range of aggregate handling and feeding equipment.

For more details circle 161 on Enclosed Return Postal Card.

FINISHERS: A 24 pg. brochure has been announced by Barber-Greene Co., 400 N. Highland, Aurora, Illinois, describing their high-speed, heavy-duty asphalt finishers. These are the crawler mounted Model SA-60 and the pneumatic tire mounted Model SB-60.

Sixteen new features, common to both models, are listed and illustrated in the brochure. Among these are 100% planetary power steering . . . a self-cleaning 10-ton capacity hopper . . . articulated and stabilized suspension on both puenmatic tired and crawler mounted models . . . an oscillating push roller . . . and a hydraulically operated high speed tamper. In many cases, fully diagrammed and illustrated double page spread illustrate the features listed.

For more details circle 162 on Enclosed Return Postal Card.

CONCRETE SPREADERS: Two new Rex concrete spreaders, general purpose Model MW, and the new self-widening Model PW, are now coming from the production lines of Chain Belt Company, Milwaukee 1, Wis. Features of these spreaders and specifications are now available in two new bulletins and companion specification sheets.

Model MW offers a screw type spreader. Its design provides positive spreading action—and traction—through instant screw control and its four-wheel drive. It is available in widths from 12 ft. to 18½ ft. and from 20 ft. to 25 ft.

The second new Rex concrete spreader was designed to combine the functions of spreading and finishing on one machine.

Width changes, from 10 ft. to 15 ft. and 12 ft. to 18½ ft., can be made with the unit on the move. Power widening eliminates costly, time-wasting manual changes, and the third line of forms.

For more details circle 163 on Enclosed Return Postal Card.

LOADER:; A new 9000 lb. capacity Case W-12 loader—a 4-wheel drive, rear-wheel steer unit for materials handling, mine and quarry work and land clearing is detailed in a new 16-page catalog from J. I. Case Co., Racine, Wis. "Fact Finder" index permits quick reference to outstanding features, including: balance and stability; heavy construction; power operation; economical diesel engine; interchangeable buckets, with 1⅝ and 2½ (std.) and 3½ cu. yd. capacities. Other loader models in the line are shown and described along with optional equipment such as winter cab, snow plows, brush rakes, other attachments.

For more details circle 164 on Enclosed Return Postal Card.

DRILLING EQUIPMENT: A new 12 pg. bulletin containing data and operating information on a complete line of crawler mounted drilling equipment is available from Gardner-Denver Co., Quincy, Ill.

The bulletin offers complete information on drill carriers, drill feeds and various types and sizes of drills. Combinations of this equipment also are graphically illustrated to show the right combinations for any specific drilling application. Construction features, operating features and specifications are presented in pictures and diagrams.

For more details circle 165 on Enclosed Return Postal Card.

LIME AS STABILIZER: A 6 pg. booklet was announced explaining the advantages of lime as a stabilizing additive in road construction. Distributed by American-Marietta Co., Milwaukee 1, Wis., the fully illustrated paper covers subbase and base construction, mixing and compacting and equipment used.

For more details circle 166 on Enclosed Return Postal Card.

LENKER
Direct Reading
LEVEL ROD

•

No Computations

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Every Rod Reading an Elevation

•

Awarded Medal of Merit for Utility by Franklin Institute of Philadelphia

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SUNBURY, PA.

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JOB-SITE CONCRETE TESTER FT 20-E

- CONFORMS TO ASTM STANDARDS
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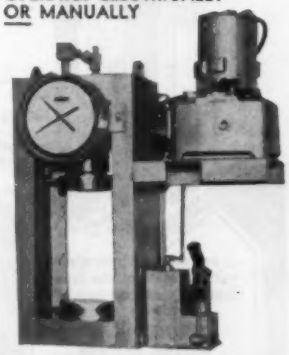


- PERMANENTLY MOUNTED ELECTRIC PUMP
- 250,000 LB. LOAD RATING FOR CYLINDERS, CORES, BLOCKS, BEAMS, CUBES, BRICK AND DRAIN TILES

FORNEY'S, INC.
TESTER DIVISION • BOX 310
NEW CASTLE, PA., U. S. A.

. . . for more details circle 295 on enclosed return postal card

Manufacturer's Literature

NEW BULLETIN: Recently introduced by Kohler Co., Kohler, Wis., is a 4-page monthly bulletin, KOHLER ENGINES IN ACTION, the August issue of which featured a cost-cutting "brick buggy" for mason contractors, a new utility car named the "Scat," and other applications of Kohler engines.

Designed to provide photographs and stories that are lively and readable as well as informative, the new publication depicts what the title suggests, Kohler engines in action from the smallest Kohler engine, the 4-horsepower K91 to the largest, the 24 hp. K662.

For more details circle 167 on Enclosed Return Postal Card.

FEEDER/LOADER/SCREEN: Descriptive literature explaining details and specifications of the feeder, conveyor and screen is available from the Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee, Wis. The 4 pg. pamphlet enumerates cost-cutting features and features claimed to be exclusive to Lippmann. Design is compared to the design of other types of machines.

For more details circle 168 on Enclosed Return Postal Card.

With the Manufacturers

LINE MATERIAL: E. M. Gibbs was named manager of Line Material Industries' Birmingham plant. Mr. Gibbs, who joined L-M in 1948, has held successively the positions of industrial engineer, Kyle products plant; assistant to Kyle plant manager; factory manager, Jeffery-Dewitt porcelain plant; and assistant plant manager and, later, factory manager at the Macomb plant. Mr. Gibbs is an engineering graduate of the University of Illinois.

KOPPERS DIVISION: John A. Hartzell, Manager of the Coke Plant Sales Department, has been appointed a Vice President in the engineering and construction division of Koppers Company, Inc. Mr. Hartzell has been Manager of the Coke Plant Sales Department since 1951. He joined the Company in 1922 and, after serving in a number of capacities in the Engineering Department, was named Assistant Manager of the Coke Plant Sales Department in 1944.

FLINTKOTE: Stockholders of the Flintkote Company at a special meeting held in Boston approved the proposed merger of the Diamond Portland Cement Company of Middle Branch, Ohio, into Flintkote. The action also paved the way for Flintkote to acquire the M. J. Grove Lime Company of Frederick County, Maryland. Consummation of both the merger and the acquisition is expected to be completed by about Sept. 1.

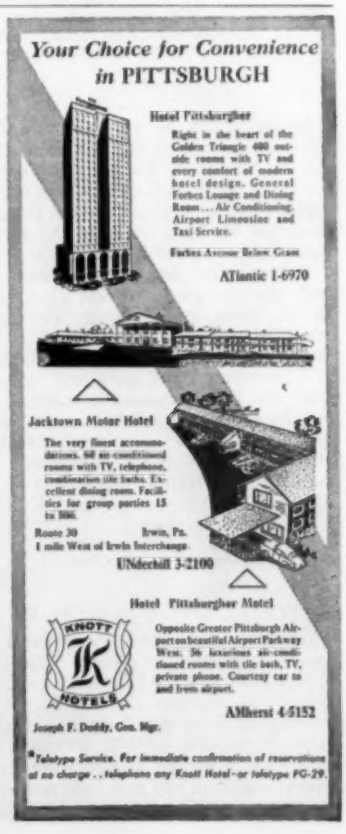
NOVO INDUSTRIAL CORP.: Edward A. Puchalski has been named sales manager for Milwaukee Crane, a division of Novo Industrial Corp. Mr. Puchalski will handle sales of the company's complete line of industrial cranes, heavy-duty specialized crane, and customized welded bridge structures.

GENERAL ELECTRIC: Plans for construction by the General Electric Company of a $3,000,000 laboratory for the study of advanced manufacturing methods were announced by H. B. Miller, vice president of manufacturing services.

The new laboratory facility will consolidate in one location six manufacturing services components now operating at various locations in Schenectady. Construction of the company-wide facility will begin in early 1961 and it is scheduled for completion late the same year.

UNDERWOOD SAND SPREADER: Widely used for snow removal and ice control, the Underwood Sand Spreader now is manufactured by Sturtevant Mill Company, Dorchester, Boston, Massachusetts. Charles N. Wood Company, Watertown, Massachusetts, will continue to act as sales agent for the sand spreader in the northeast, Sturtevant announced. The Dorchester firm acquired manufacturing rights to the sand spreader when it recently purchased all patents, drawings and patterns of the Underwood Machinery Company, Somerville, Massachusetts.

KAISER ENGINEERS: Franklin T. Matthias has been appointed Manager of Heavy Construction for Kaiser Engineers, L. H. Oppenheim, vice president and general manager, announced today. Matthias will be responsible for all of the company's heavy construction activities in the United States and Canada. Matthias was graduated from the University of Wisconsin and holds both bachelor's and master's degrees and a graduate Civil Engineering Degree conferred in 1940.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Right in the heart of the Golden Triangle 400 outside rooms with TV and every comfort of modern hotel design. General Forbes Lounge and Dining Room... Air Conditioning. Airport Limousine and Taxi Service.
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As pictured here, the 15 acre Cotton Bowl parking lot was used for one of the largest displays of machinery ever exhibited by a manufacturer.

Deere's Big Tractor Unveiling at Dallas

(See Deere's tractor announcement in "New Products" section in this issue)

Deere & Company's complete new tractor line was unveiled at Dallas before 5000 dealers from the U. S., Canada and 15 other countries. These people were airlifted for "Deere Day in Dallas", marking the first time in Deere's history that the whole worldwide sales organization was assembled in one place.

The huge display included construction, industrial and farm machinery.

Because of a group of French-speaking dealers present from eastern Canada, a "United Nations type" translating system was set up, the French-Canadians wearing earphones and hearing simultaneous translations.

Movies and TV in the round were used for the first time in the staging of the sales meeting. A five sided movie and TV screen was set up for Deere in the Dallas Memorial Auditorium using synchronized projectors to show motion pictures on all five screens. All speakers were seen on the five-sided TV screens.

WHAT ABOUT YOU, MR. READER?

Are you still active in the field? Have you moved or changed your position?
Unless you send this information directly to use we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *Your* name might be cut from the mailing list.

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☐ I do receive ROADS & STREETS and wish to continue to receive it.
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HAROLD PATE

WITH POWER SHIFT TRANSMISSION...

"We proved the 977H Traxcavator doubles our production"

Strunk Bros. of Tiskilwa, Ill., put its new Caterpillar 977H to the test.

"We put the Series H machine against the earlier 977 . . . had them side by side excavating and loading 10-yard trucks," Superintendent Harold Pate reports. "Both machines had expert operators. The 977H loaded out five trucks in the same time the older machine got 2 or 2½ trucks. We proved the new 977H Traxcavator doubles our production."

Operator Wilbur Crank, who loaded 11 to 12 cu. yd. of clay and loam in the trucks in 60 seconds with the new unit, explains why.

"It's easier to operate. It's got more power. It's faster and handles well in mud. But most important, it's got that power shift transmission. That's the biggest part of the faster cycles. I can shift down instantly—and I mean *instantly*—to the speed I need. A flick of the wrist and I'm in second for moving. Another flick and I'm in reverse."

The 977H is a machine with more of everything. Horsepower of its turbocharged engine is up 50%—to 150 HP at the flywheel. Hydraulic lifting power is up 41% because of Caterpillar's *live action* hydraulics. That means faster lifting speed and greater lifting capacity without robbing power from the tracks.

Bucket capacity is up 11%—to 2½ cu. yd.—and there's a stronger linkage to handle the heavier loads. And there's a larger, stronger, lifetime lubricated undercarriage to stand up under the roughest conditions. It never needs servicing until rebuilding.

You may be missing a lot—in profits and production—if you aren't using one of the new Series H Traxcavators. See for yourself. Your Caterpillar Dealer will demonstrate one of the new machines side by side with the machine you are now using on your present job. And watch the difference!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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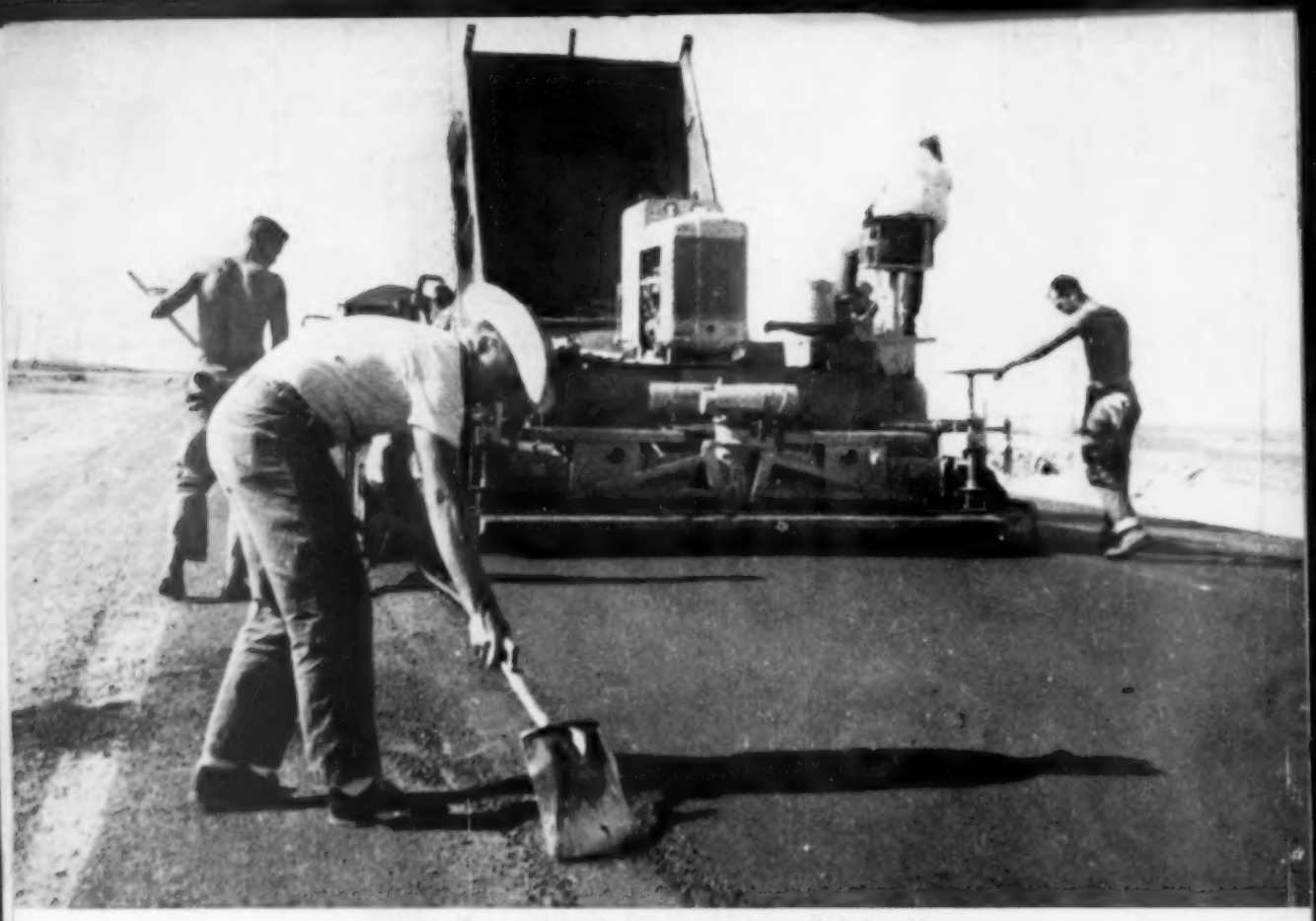

Hot-mix Texaco Asphaltic Concrete pavement is speedily laid on 11 miles of Nebraska State Highway 61. No time-consuming curing period is required.

Nebraska builds Asphalt highway for hauling wheat crop

This 11-mile section of State Highway 61 passes through Nebraska's Sectile wheat growing country. At harvest time, heavy trucks loaded with grain use the highway to reach elevators and rail heads.

The pavement constructed on this heavily traveled route consists of three inches of heavy-duty hot-mix Texaco Asphaltic Concrete, laid on a six inch granular base. The Texaco Asphaltic Concrete was placed in two courses, a 1½ inch binder course and 1½ inch wearing surface. Nebraska used an asphalt cement with a 100-120 penetration in the pavement mix.

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